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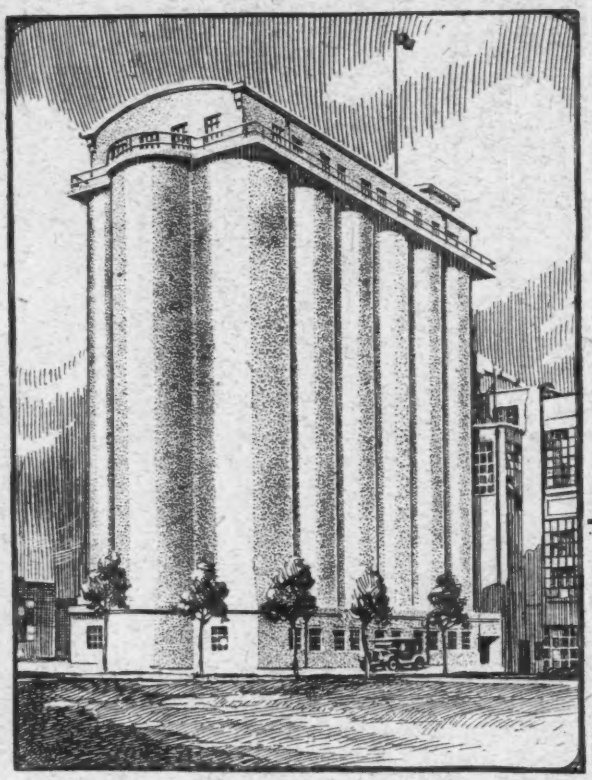

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The editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings whenever possible.

September, 1928

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Caramels.

SOME INTERESTING observations and conjectures upon the basic structure of caramels have recently been made in America by Sherman Woodrow. Certainly there is not the slightest doubt that the subject of caramels provides a practically untrodden field of great opportunity for the scientific manufacturer and the enquiring chemist, such as Mr. Woodrow has shown himself to be.

How many experienced caramel makers could answer the apparently simple question: What is a caramel and what exactly is the part played by each ingredient? It is safe to say that anyone who could answer this in definite and scientific terms—and we are sure that no such person exists—would be able to produce such caramels as would stir the candy-loving public to its very depths. It is high time that caramels were taken out of the realm of guesswork and their properties brought under exact control.

Sherman Woodrow's attempt at precise definition is that a caramel is "a casein jelly, thickened by addition of sugars, dextrin, etc., and holding, in an emulsified state, milk fat or other fats. The characteristic flavour is due to the burning or caramelisation of some milk product used in its manufacture, and is that of slightly burnt milk and not sugar." This interesting theory will require a good deal of practical research before its validity can be established. The casein is believed to act as a jellying agent for the entire mass and as an emulsifying agent or protective colloid for the fats. The dextrin of corn syrup imparts "body." In the opinion of experienced candymakers, fresh, unsweetened, whole condensed milk imparts the highest "stand-up" quality of any milk product, and is considered far superior to sweetened condensed and to powdered milk. Fat contributes to the richness of the caramel flavour, and performs the function of a lubricant, making it chewable without being sticky. Thus, the fat must have a suitable melting point, high enough to resist summer temperatures but lower than body temperature. Certain caramel pastes on the market, consisting of dry colloidal mixtures of casein with vegetable fats, are potent in imparting jelly strength to caramels.

It has been found that a small amount of pure beeswax (1 lb. to every 125 lbs. of stock, added before it boils) will tend to prevent surface grain. For very high-priced caramels, honey or invert sugar may be employed in combination with cane sugar. Some prefer to use corn syrup and cane sugar in equal proportions, which, with proper amounts of milk solids, will make a caramel that will stand up and not grain on the surface as quickly as when invert sugar is used.

Except where using a caramel paste, the complete

batch should be put in the kettle at the start and the boil continued without interruption to the finish. Adding cream or other ingredients from time to time while the batch is cooking has a tendency to "break the grain," causing the caramels to become dry or show grain on the surface within a short time.

"Rope" in Bread.

Bakers are greatly indebted to E. A. Fisher and P. Halton, of St. Albans, for their comprehensive work on the cause and prevention of "rope," a disease of bread of very common occurrence, particularly in hot weather. The disease first appears as brownish spots or patches in the crumb, accompanied by a faint sickly smell. It spreads very quickly throughout the loaf, producing a moist and sticky mass capable of being drawn out into long threads.

"Rope" is due to the activities of a group of closely related slime-forming bacteria, the *B. mesentericus*, and for their development, moisture, warmth, and a low degree of acidity are necessary. Many of the methods suggested for controlling the disease depend on the addition of acids or acid substances to the dough. Of these substances, acid calcium phosphate is the most effective and is least open to objection. Fisher and Halton found that slight stickiness and faint smell in bread do not mark the beginning of ropiness (as was formerly thought), but are characteristic of a late and acute stage of the disease.

Biscuit Merger.

It is not without significance that Christie-Brown Co., Ltd., of Toronto, a firm established some seventy-five years ago and the largest producer of biscuits in Canada, has been absorbed by The National Biscuit Co., of U.S.A. We understand that it is the intention of the new amalgamation to develop an English and British Empire export business. Already the American firm possesses the Viau Biscuit Co., the largest producer in the province of Quebec, and the National Biscuit Co., of Canada.

New Preserving Processes.

It is understood that a successful development in Californian grape packing is to freeze into a solid mass the contents of the barrels after they have been packed with the fruit, filled with fresh, unfermented grape juice, and sealed. The barrels are kept in cold storage until shipment and during transport by boat or rail.

A correspondent informs us that another new Californian process for packing pears involves combustion of a special solution inside a can packed with about twenty pounds of fruit, thereby creating an inert atmosphere. It is said that the fruit shows no signs of change ten months after packing.

We are also informed that in certain quarters of the meat packing industry, the process of spraying chilled brine into meat storage rooms is being tried. By this means a lower and more uniform temperature is obtained, and a more efficient air-circulation is created with the help of a system of baffle plates.

Finally, a machine has been invented which makes sausages without skins. The sausage-meat is pressed into a metal tube, which is then heated, whereby soluble meat proteins are brought to the surface and coagulated to form a casing.

Our "Boric Bondage."

Sir William Pope has said with truth that food preservation "has been a browsing ground for the crank and the faddist for generations." The recent outbreak of para-typhoid, somewhat hastily attributed in some quarters to "food poisoning," has disturbed the dyspeptic slumbers of these self-appointed guardians of the public health and has let loose a veritable chorus of shrieks in the daily Press.

Assuming the diagnosis of "para-typhoid" *is* correct, there is, as usual in those matters which are seized upon as public fodder by the daily Press, general confusion as to the ascertained facts of this disease.

The group of intestinal or colon-typhoid bacteria is of special importance because of several disease-producers that it contains. There are the colon subgroup, the enteritidis subgroup, and the typhoid-dysentery subgroup. Within these subgroups the various species are sometimes difficult to differentiate. The colon bacteria include those normally present in the intestines; amongst the important typhoid-dysentry bacteria are those causing typhoid fever and those causing epidemic bacillary dysentery.

The Enteritidis Bacteria.

The organisms belonging to this subgroup have been described by different authors under various names, and sometimes so inadequately that considerable confusion exists as to the differentiation of species. Most of the organisms are important in producing disease as secondary invaders, such as are classed under bacterium enteritidis and bacterium paratyphi.

Bacterium enteritidis was first isolated by Gaertner (hence "Gaertner's bacillus") from the flesh of a diseased cow, from which had resulted fifty-seven

cases of meat poisoning, with one fatal case. Since that time, the organism, together with closely related forms, has been isolated from a great variety of sources, and is perhaps the commonest cause of food poisoning, frequently mistermed ptomaine poisoning. It can gain entrance to the flesh of an animal after slaughtering, and rapidly penetrates into the tissues, even at relatively low temperatures, and has been found in the normal feces; hence one of the chief arguments for cleanliness in slaughter-houses.

Para-typhoid.

Some writers in the Press are confusing Gaertner's bacillus with bacterium paratyphi. Organisms of the latter type have been repeatedly isolated from cases of so-called para-typhoid fever in man, a disease resembling clinically the true typhoid fever. It is frequently diagnosed as a result of food infection, and in some cases has been definitely shown to be due to the use of contaminated milk. One authority states that it is probably due, in most cases, to the consumption of infected meat, but it should be noted that in several cases infected water has been definitely shown to be a source of infection.

"Bacillus hystericus."

Yet, in spite of the uncertainty attending the diagnosis of para-typhoid and of the still greater uncertainty in tracing the disease to its true origin, we have these food faddists of the Press leaping forth with: "I told you so; you wouldn't listen to me. This comes of eating meat or drinking milk or cream, or of banning preservatives, or boric acid in particular, or of being tied to the apron-strings of a self-important Minister of Health, or of not following the advice of the Minister of Health and using more refrigeration"—or whatever the particular pet theory of a particular paper might happen to be, the chief consideration being that it differs from those of its Press rivals.

Mr. Macquisten, M.P., declares that if the regulations are continued, the results will be cumulatively disastrous in each summer, to which he adds: "Preservatives are not used in the United States, I believe, but there, from the moment of preparation to the moment of delivery, food is kept in cold storage. And after delivery, the householder puts it in cold storage. But in this country we have no such facilities."

Clean Food.

But, are there any reasons, we may ask, why we should not possess these facilities for cold storage? Have the Americans a monopoly of common sense and intelligence? Do our retailers and householders prefer to endure the consequences of contaminated food rather than pay the price of proper preventative equipment? If so, then they have only themselves to blame. The daily Press would be much better occupied in stirring up an agitation for clean food than in wrangling amongst themselves over a heap of old bones. It is the obvious duty of the Press to educate the public, and by this we mean the retailer and the householder. At present these pressmen appear to be too busy chasing shadows.

This Journal can, and does, play its necessarily small part in this vitally important task of spreading information concerning the basic mechanism of spoilage. Our readers are mainly producers of foodstuffs, and, in these days, it may be truthfully said that they are rarely to blame for any evil effects consequent upon spoilage. In such cases the culprits must be sought for amongst the retailers and the members of the consuming public. People who rail most furiously against what they are pleased to term "fussy and meddling authority" do not appear to realise that they are themselves as much at fault as anyone else. Their outburst of strong feeling is obviously an attempt to shift the responsibility on to other shoulders for what they admit is an undesirable state of affairs.

Confectionery Spoilage.

Although the problem of spoilage is most important and obvious in the case of quickly perishable foods, like meat and milk, it extends to embrace equally important, though less obvious, commodities, like candy and chocolate. We cannot recall to mind anyone who has rendered manufacturer, retailer, and consumer a more signal service than T. Macara, the Director of the Research Association. We offer no apology for repeating some of his observations on the causes of deterioration of chocolate, which have been collected in a pamphlet addressed to retailers. Our object is merely to indicate the scope of this pamphlet, which every confectioner should read and re-read until it becomes as familiar to him as his Bible.

Fat Bloom.

This is a result of excessive temperatures, and in mild cases consists of a layer of tiny cocoa butter crystals, which cover the surface of the chocolate as a greyish film resembling the bloom on grapes. In more extreme cases the surface is covered with a pale brownish layer of sugar and cocoa material, due to the cocoa butter having almost entirely left the surface. In either case, the gloss is replaced by a stale appearance.

Direct sunlight may cause this defect; hence the use of sun-blinds. Storage in places where direct heat from fires and radiators may affect the goods should be avoided; likewise, places where hot air is liable to collect.

Sugar Bloom.

This is a result of moisture condensation and absorption, and consists of a layer of minute sugar crystals imparting a greyish and roughened appearance to the surface. If chocolate at a low temperature is brought into a moist atmosphere at a higher temperature, moisture will be condensed on the surface of the chocolate. This moisture readily dissolves the fine particles of sugar in the surface layer, forming a syrupy film on the goods. On evaporation, this syrup deposits the fine crystals known as sugar bloom. The necessary moisture for the formation of a syrup may be derived by absorption of moisture from the air by the chocolate without the changes of temperature, which are liable to bring about condensation.

Chocolate should, therefore, not be stored in a place where the air is damp or in a damp place of any kind. Do not ventilate during wet and foggy weather or when a warm, moist spell follows on a very cold one. It is unwise, also, to store or exhibit chocolates for a long period.

Finally, remarks Mr. Macara, "*Do not blame the chocolates when bad storage conditions have been the cause of trouble.*"

The Campden Research Station.

The Long Ashton Report should be in the hands of everyone connected with fruit canning and preserving. It is the report for 1927 of the Agricultural and Horticultural Research Station (The National Fruit and Cider Institute) at Long Ashton, Bristol. Of its 222 pages, 30 are devoted to the activities of the Campden Research Station. This section contains six short papers by A. Appleyard and F. Hirst, describing experiments made in connection with fruit juices, jams, preserved tomatoes and peas, and commercial canning.

We sincerely hope that the changes foreshadowed in the Report will be speedily brought about. It is stated that the Station has, during the past year, been fully occupied in consolidating the position which it has earned during the past few years as the advisory and research centre for the young and rapidly expanding canning industry in this country. We note that the number of students attending the courses has increased considerably, and applications have had to be refused owing to lack of accommodation. If this state of affairs persists much longer, it is safe to predict that the much vaunted expansion of the industry will receive a premature check.

We repeat what we wrote last month: in order to ensure continued prosperity, it is absolutely essential to provide *now* adequate accommodation and up-to-date equipment for the training of the future managers, engineers, and chemists of the industry. The equipment must include *commercial* plant of the latest types, and the educational staff must include men of approved practical experience, as well as those of scientific and technical ability. Why should our young men have to go to America for this training, and in most cases stay there, or, if they do come back, tend to lean on that country for supplies of plant and machinery? Are we too niggardly and short-sighted to provide what is required for the suitable education of scores of young men of first-class ability who are ready to leap into a promising field of industrial activity, providing they can get the necessary preliminary training?

Vacuum Packing.

European experiments on the vacuum packing of dairy products have been closely followed by investigators in New Zealand. Mr. Mays, of Wellington, reports that cheese packing is being thoroughly tested in order to determine its commercial possibilities; 300 cheeses packed in vacuum containers have been shipped. The containers consist of two pieces of metal stamped to the shape and size of the standard 80-pound export cheese, and they are soldered along their edges of contact, together with a length of wire, which can be readily peeled off when the container is required to be opened. The machine for exhausting and sealing has been developed by the Taranaki Dairy Products Laboratory.

It is claimed that a cheese which had been packed in vacuum for fourteen months lost only one pound in weight, had no rind, retained its original moist condition, and cured well. After three months the vacuum had been replaced by an atmosphere consisting chiefly of carbon dioxide generated by the cheese, and the moisture near the surface had been forced to the outside, carrying with it a certain amount of fat; the cheese was quite moist throughout, with no variation in colour, taste, ripeness, or other determining quality.

There are, however, several questions to be settled before a conclusion can be reached as to the commercial possibilities of the process. Thus, will the additional cost per cheese be covered by returns from greater delivered weight? Will the oversea retail customer pay more for a cheese without rind and of higher average quality than an air-cured cheese? Will the retailer buy sealed containers from opened sample? and, will the cost of distribution of individual packages be too high for the trade to bear?

Fish Meal.

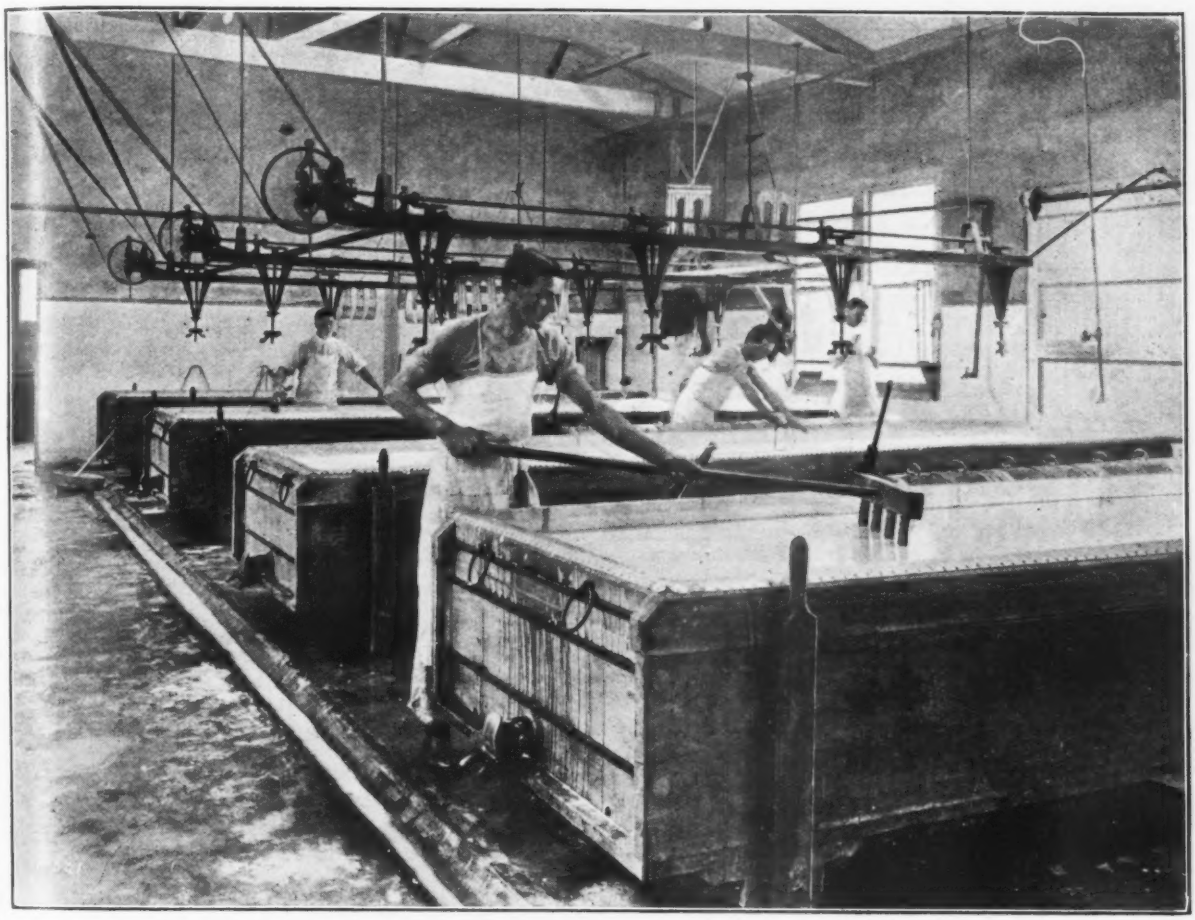
It is reported that by means of a new plant recently developed by a London firm, it is now possible to produce fish meal with only 1 per cent. of oil and 75 per cent. of protein.

The General Principles of Cheesemaking

By L. J. LORD

This series of articles will expound the general principles underlying the practice of cheese-making.

PART I.



Cutting the Curd in a New Zealand Cheese Factory, in the Making Room.

THE MANUFACTURE of cheese is one of importance throughout most of the temperate regions of the civilised world, there being some hundreds of varieties known; a great number of them are, however, confined to the restricted districts where they are made, either because they are not suitable for transportation, or because they have no reputation abroad.

Cheese is made, in the first place, from the milk of various domesticated animals, including that of the cow, sheep, goat, camel, llama, and reindeer, but the English market is only acquainted with cheese made from cows' milk, except for certain quantities of one particular kind of cheese, the original and legitimate brands of which are made from the milk of sheep.

These animals are responsible for producing the milk for the manufacture of the genuine French "Roquefort." To this fact is said to be due the peculiar peppery tang that is sometimes noticeable in this cheese. There is, however, a very good class of cow's milk "Roquefort" coming into this country from Denmark, manufactured as nearly as possible upon the lines of the original French brands. Probably the most important detail upon which the copyists had to employ their powers of imitation was, not the source of the milk, which is drawn from sheep feeding on the plateau of Larzac, and the hilly

districts adjoining that corner of the department of Aveyron, but the provision of similar conditions of ripening as nearly as possible identical with the cold, well-ventilated caves of Roquefort. These caverns in the mountain side have a very low natural temperature, combined with a free circulation of air. All the cheese manufactured in the neighbourhood is brought to these caves to ripen under the care of several "Sociétés" concerned in the industry.

French law confines the use of the name "Roquefort," as applied to cheese by vendors or exporters, to those made from sheep's milk upon the recognised local methods of preparation and curing. Makers have to make a declaration before a magistrate that they intend to sell the cheese under that name, and no such cheese factory is permitted to have any but sheep's milk on the premises, nor may any but sheep's milk cheese be stored in the ripening caves.

There are a great many varieties of cheese made from goat's milk in France, Germany, and Italy, but they seldom find their way into this country.

Given the supply of milk in, or brought to, the condition required for coagulation, the first process of cheese-making is to transform the milk into a junket, the preliminary step towards forming a curd, and this is done by means of the addition of rennet extract to the warm milk.

The Nature of Rennet

Rennet is obtained as an extract of the fourth stomach of a suckling calf, and amounts to a solution of the stomach juices whose natural function is—at that age—the digestion of milk, and milk only. In fact, the stomach of an adult animal would be of no economic use for the purpose.

The rennet contains a rich store of natural ferment producing bodies—digestive ferments—that first turn the milk into curd and later bring that curd to a condition in which it is easily assimilated as a food. The same process of coagulation and part digestion performed in the stomach of anyone drinking milk is carried out in the cheese factory, first upon the coagulated milk and later within the cheese during the process of what we call curing or ripening.

On the whole this process is helped considerably by certain milk ferments already in that liquid. These, of themselves, would curdle it by rendering it sour, so that it is found convenient to allow the milk to acidify slightly, or even help it to do so by direct inoculation with a milk ferment "starter," before adding the rennet.

At the same time the cold milk is warmed up to blood heat, or somewhere near the temperature at which milk comes from the animal's udder, and at which the milk and rennet ferments work best together in the process of curdling the milk. The actual temperature chosen varies within about 10° F., according to the kind of cheese which is in the process of manufacture, and to the condition of the milk and the prevailing weather. So also does the length of time allowed for the milk to change into a junket firm enough to cut up with knives, but, taking a comprehensive view, this may be stated to average about an hour. If the cheese desired is to be coloured, a small quantity of liquid annatto is mixed with the milk previous to pouring in the diluted measure of rennet.

After a few minutes spent in stirring the rennet into the milk, so that it becomes thoroughly mixed and so well distributed that the curd which forms shall be of uniform consistency, the whole mass of liquid is left undisturbed for the length of time stated, precautions being taken, if necessary, to conserve the temperature meanwhile.

Working the Curd

The curd is now fit to cut, this operation being performed by means of two sets of parallel knives set in a frame, with the result that the curd is resolved into small pieces, roughly the shape and size of cube sugar.

There is one notable exception to this method of cutting, in that Stilton cheese junket is scooped out into cloth drainers, the sharp-edged ladle that is used serving to cut it sufficiently to ensure the draining out of the whey from the curds.

To return to the general run of cheese-making: the cubes of curd, if left to themselves, settle down in the surrounding liquid which the act of cutting has caused to be expelled from the mass. This liquid is called whey, and is practically a pure solution of the animal sugar that forms a natural component of milk.

Upon cutting, a mild fermentation proceeds within the curd particles by which they gradually acidify, at the same time shrinking and expelling more of their whey. If this combined action is left to go on unchecked or unaided, a very tender curd still heavily charged with moisture soon reaches the acid stage. This sloppy, acid condition is only admissible in certain types of cheese not well represented in this country, and the more general practice after cutting the curd is to warm up the whole bulk of the transformed milk while keeping it moving in the tub or vat by means of hand stirring with a wooden rake.

The operation of "scalding," where carried out, is a very important one, as, in relation to the large types of cheese, much depends upon the degree and character of the shrinkage that is brought about.

If done too quickly the tendency is to cause a skin to form on the curd particles, leaving them in a pulpy state inside, a sure source of trouble later on. Also, too much heat applied early in the proceedings will necessitate so brisk a movement in the stirring that the curd suffers by being caused to discharge some of its goodness into the whey, thus depreciating the quality of the cheese. And if the floor of the cheese vat—the container in which the cheese is being made—is too hot when the curd is ready to settle, it will become "burnt"—that is, the bottom of it will get tough and even horny in texture.

The old farm practice was to scald by means of supplies of hot whey dipped out of the vat, heated in a small container held in an open "copper," or clothes boiler, and strained back into the milk vat. It is now more usual to use a jacketed or hollow-walled vat, into which water can be poured and heated from a steam boiler by means of a steam jet discharging into the water jacket. Hence the particular care now necessary to avoid overheating.

By this operation there eventually results a multi-

tude of compact little grains of curd swimming in a greenish-yellow whey. When the curd grains have attained the right degree of firmness, there ensues a period of quietude during which the curd rests at the bottom of the whey until it has become slightly more acid and shrunk still more into the form of a somewhat coherent mass of granular construction.

It is not suggested that, with varieties of cheese not customarily subject to a scalding process in the making, less knowledge and skill are required to ensure a first-class product. Quite the contrary, for the required condition of the curd prior to cheese-moulding has to be attained without the aid of extra warmth. Warming the contents of the milk vat, after cutting the coagulum, has the double effect of aiding the maturation of the curd by favouring the progress of the acid fermentation, and of bringing it under control by firming the curd and expelling the whey. Without extra heat this development has to be encouraged and safeguarded with equal care if satisfactory results are to be obtained.

The Maturing Process

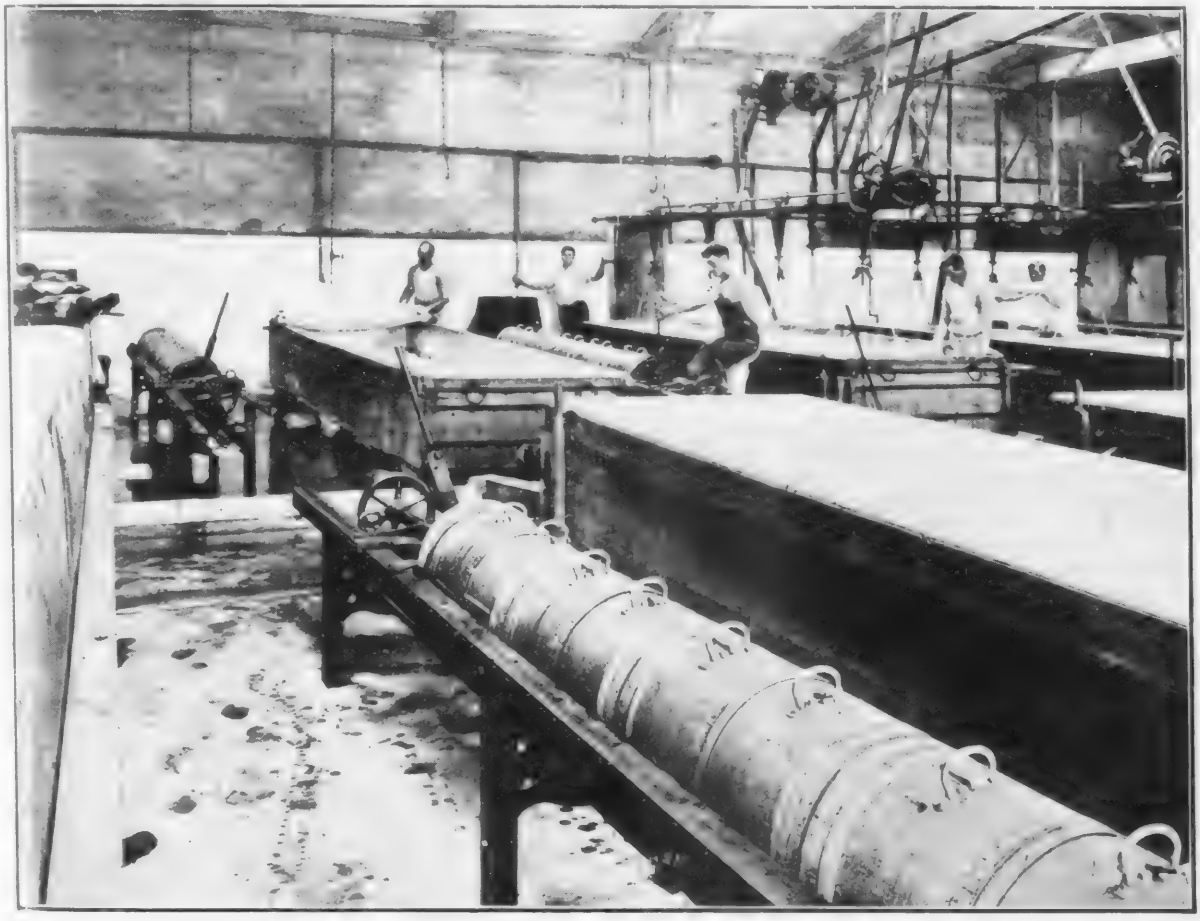
The whey is now run off to the piggeries and the mass of curd cut into blocks. The curd has become solid enough to pile in a shallow heap for a short time, when it is cut and piled again, slowly draining and shrinking meanwhile into a more compact condition. This continues for an hour or two until the acid coincident with other factors has digested the mass of curd from a granular into a flaky state, and it is then ready to grind in a mill.

At this point—so far as most of the English varieties are concerned—salt is mixed with the curd, now reduced to a state of small ragged pieces by the tearing action of the curd mill. If not salted before putting into the moulds which shape the finished cheese, salt is rubbed into the cheese after it has been shaped, or alternatively, the cheese is immersed in brine for a day or two. This practice is fast becoming out of date.

Moulding and Pressing the Cheese

The ground curd—with or without salt, according to custom—is now filled into wooden or steel moulds of the desired size and shape. This mould, or cheese-vat, is first lined with a linen cloth. After filling, the margin of the cloth being folded over, the curd is covered with a "follower," a piece of wood shaped to fit just into the mould, so that the cheese can be put under pressure.

(*Continued on page 463.*)



Pressing Cheese in a New Zealand Factory, in the Making Room.

Nutritional Bread (Tomato)

By J. BOYD

THE TRADE in fancy or speciality bread is not so regular nor so large as that done in ordinary white bread.

This depends a good deal on sentiment, and although the flavour and appearance of the different kinds are characteristic in each case, and people like these breads for a time, their fancy is liable to constant change, and they invariably come back to their "first love," white bread. Periodically, we have great controversies as to whether white or brown bread is the more nutritious.

The psychological element in food values has been known, both physiologically and gastronomically, for a long time, but it has been largely omitted from the teaching of some recent writers.

After all, what does it really matter? One section of the public wants white bread, another section brown, and several other sections want fancy bread with extra sugar, sultanas, currants, etc., mixed through the dough; and in many cases the higher the price for the speciality breads, the more keen the customers become to acquire them, and if recommended by their medical advisers to eat certain varieties of bread only, it is for the modern bakers to supply these and go on increasing their trade, at the same time pleasing their patrons.

The tomato bread dealt with in this article is not of the usual variety; it has a flavour very much appreciated by a large number of people, has good keeping qualities, and finds a ready sale.

Tomato Bread: Ingredients

5 lbs. strong flour.	4 ozs. tomatoes.
2 lbs. soft flour.	2 ozs. salt.
4 ozs. golden syrup.	3 ozs. yeast.
4½ ozs. lard.	2 lbs. water (approximate).
1½ ozs. glucose.	

Method of Manufacture

Take 8 ozs. of the water at 190° F., break down tomatoes with it and pass through a fine sieve; then take 4 ozs. of water at 190° F., and wash the remainder of tomatoes on sieve into bowl underneath.

Add syrup, glucose, 1 oz. of the salt, and the remaining 1¼ lbs. water at a temperature of 108° F.

Add half dried flour and half plain strong flour sufficient to make a nice batter.

Allow to lie in warm corner for 15 to 20 minutes when it should be ready; then pour into print which has the other ingredients in it.

Make into a nice dough, put on warm boards and knead it well and often. Allow to prove for one hour, weigh off at desired weight, mould, form into loaf shape, place in tins and when ready, bake in sound oven.

When cold, wrap in cellophane paper, and surround this with a narrow paper band of suitable colour and design. A yellow band with bright coloured tomatoes stamped or printed thereon looks very effective and indicates at a glance what manner of bread is contained in wrapper. Note—the dried flour referred to in instructions consists of half the quantity of the strong flour placed in medium oven to colour a delicate brown.

This heated or dried flour must not be added to doughing when too hot.

To ensure fine texture in all loaves, it is essential that dough receives a great deal of kneading.

Kneading increases very much the number of threads of gluten in the dough, renders it more ductile and makes its threads much finer and increases the number, and therefore reduces the size of all the vesicles of the dough, thus giving a much finer texture.

Texture must not be confused with "pile." If the tiny holes, or vesicles, in the crumb of a loaf are small, all about one size, and evenly distributed, we call the texture fine. If they are coarse and vary in size the texture is bad or coarse.

Glucose used as a bread improver, quickens the rate of gas production by reason of its being easily assimilable by the yeast, and if not all used up by the yeast, aids the bloom of the loaf.

Glucose must be used with discretion, or it may lead to over-ripeness of a dough and be other than a bread improver. Used in short process doughs, as above, glucose is safe enough and has much to recommend it.

For all-night doughs or sponges, it is best left out.

Vinegar for Gout

ACCORDING to a book on the subject of vinegar, entitled "Der Essig," and printed in Munich, Germany, a variety of complaints such as lumbago, gout, and podagra have been cured by the external application of vinegar. The usual method appears to be that of applying a linen cloth soaked in strong heated vinegar to the affected parts and then covering with a woollen cloth.

The Effect of Sugar, Acid, and "Set" on the Keeping Properties of Jams

By F. HIRST, M.Sc., A.R.C.Sc.,
Acting Resident Director, Campden Research Station, Glos.

By permission of the University of Bristol, the following paper is reproduced from the Report for 1927 of the Agricultural and Horticultural Research Station at Long Ashton, Bristol, England. This paper records the results of research work carried out at the Campden Research Station.

JAMS ARE not generally put up in airtight containers. In common practice they are marketed in glass or porcelain jars, the top of which is covered with parchment paper. Recently, metal covers have been introduced, but these are not intended to be absolutely airtight, as good jam is expected to keep for an appreciable time even after it has been opened. The only preserving agent used is sugar, and the question often arises as to what percentage of sugar is necessary to ensure jam keeping. The natural acid found in the fruit may also have a slight preserving effect.

When jam deteriorates, it is generally due to the growth of moulds, or in some cases due to fermentation of the sugars which arises through the presence of yeasts. The following experiments have been carried out to ascertain:

1. What sugar concentration is necessary to prevent fermentation and mould growth.
2. The inhibiting effect of acid on the growth of yeasts and moulds.
3. Whether the "set" of the jam plays any part in preventing fermentation.

There does not appear to be much information available on these questions. Grove* states that yeasts and bacteria do not develop in a sugar solution of 50 per cent. or more, or in a solution containing 45 per cent. sugar if the acidity is 1·2 per cent. On the other hand, he found that moulds would grow in a 65 to 70 per cent. sugar solution.

In the preliminary experiments, sugar solutions were prepared containing varying proportions of sugar. Several substances were tried as a source of nitrogen: 2 per cent. malt extract was found to be the most suitable and was afterwards used in all the solutions. The percentages of sugar added varied from 50 per cent. to 70 per cent. The solutions were poured into honey pots with screw caps and were sterilised for twenty minutes at boiling temperature. Separate samples were inoculated with:

(*a*) Wild yeast isolated from a fermenting sample of cold process jam.
(*b*) The common blue mould *Penicillium Glaucum*.

In the next series, similar solutions were prepared, but in one case 0·5 per cent., and in the other case 1 per cent. of tartaric acid was added. The samples were incubated at 22° C. An examination of the solutions was made periodically, and the results are shown in Table I.

* C. Grove, *Annual Report of the Agricultural and Horticultural Research Station*, Long Ashton, Bristol, 1918.

It will be seen that in the first series all the solutions fermented within 33 days. Mould growth was observed in the solutions containing from 50 per cent. to 65 per cent. sugar within 30 days, but there was no growth in the other cases after four months. From the above experiment it is apparent that a 70 per cent. sugar solution will ferment. Jams generally contain from 60 per cent. to 70 per cent. sugar, but with 70 per cent. sugar there is a danger of crystallisation, more so if the jam has been prepared from a very acid fruit. From the above results 67·5 per cent. sugar appears to be necessary to prevent mould growth in sugar solutions.

The addition of 0·5 per cent. acid did not appear to have any appreciable effect either on the development of yeast or on the growth of Penicillium. When the acid was increased to 1 per cent., fermentation occurred in all the solutions with the exception of the one containing 70 per cent. sugar, but it did not appear to have any serious inhibiting effect on the growth of Penicillium.

In the next series of experiments, pectin gels were prepared containing varying amounts of pectin in order to obtain variation in the "set" of the jellies. As it is impossible to get a pectin gel without acid, two series were prepared: the first containing 0·5 per cent. tartaric acid, and the second 1 per cent. tartaric acid. It was not possible in all cases to get the yeast cells incorporated into the jelly when inoculating, as the jellies set at too high a temperature. The jellies were, therefore, inoculated with yeasts at a temperature of 25° C. by plunging a sterile platinum wire into a fermenting sugar solution, and then plunging it into the jellies at two or three points. The surface of the jellies were inoculated with the spores of *Penicillium Glaucum*. The results are tabulated in Table II.

It will be seen that there is a marked difference between the results in the sugar solutions and in the pectin gels, especially so in the case of fermentation. In the well-set pectin jellies containing 65 per cent. sugar and 0·5 per cent. acid there was no fermentation after three months. In weak-set jellies there was fermentation in the jellies containing up to 70 per cent. sugar. The highest concentration on which mould growth appeared was 65 per cent.

With 1 per cent. acid, the results were very similar (Table III). The 70 per cent. jelly with a weak set did not ferment, whereas with 0·5 per cent. acid there was fermentation in the corresponding jelly. The acid does appear to have a slight effect on the growth of yeast, but in the strength used it has no

TABLE I.

Per cent. of Sugar.	50·0	52·5	55·0	57·5	60·0	62·5	65·0	67·5	70
No acid present.									
REMARKS :	Fermenting after 9 days	Fermenting after 9 days	Fermenting after 9 days	Fermenting after 10 days	Fermenting after 10 days	Fermenting after 13 days	Fermenting after 13 days	Fermenting after 13 days	Fermenting slightly at the surface after 30 days
	Mould growth after 8 days	Mould growth after 8 days	Mould growth after 10 days	Mould growth after 11 days	Mould growth after 11 days	Mould growth after 14 days	Very slight mould growth after 30 days	No mould growth after 4 months	No mould growth after 4 months
0·5 per cent. Tartaric acid added.									
REMARKS :	Fermenting after 11 days	Fermenting after 11 days	Fermenting after 11 days	Fermenting after 13 days	Fermenting after 13 days	Fermenting after 19 days	Fermenting after 26 days	Fermenting after 30 days	Fermenting slightly at the surface after 30 days
	Mould growth after 8 days	Mould growth after 8 days	Mould growth after 11 days	Mould growth after 11 days	Mould growth after 11 days	Mould growth after 14 days	Slight mould growth after 30 days	No mould growth after 4 months	No mould growth after 4 months
1 per cent. Tartaric acid.									
REMARKS :	Fermenting after 30 days	Fermenting after 60 days	Fermenting after 60 days	Fermenting after 60 days	Fermenting after 60 days	Fermenting after 70 days	Fermenting slightly at the surface after 3 months.	Fermenting slightly at the surface after 3 months.	Not fermenting after 3 months
	Mould growth after 8 days	Mould growth after 8 days	Mould growth after 14 days	Mould growth after 14 days	Very slight mould growth after 14 days	Very slight mould growth after 14 days	Slight mould growth after 3 months	No mould growth after 4 months	No mould growth after 4 months

TABLE II.

Sugar Grams.	*Acid Total.*	*Malt Extract Grams.*	*Pectin Grs. of a 4 per cent. Solution.*	*Water Grams.*	*Boiled out Weight.*	*Type of Set.*	*Remarks.*
	Per Cent.						
50	0·5	2·0	6	46·5	100	Not set	Fermenting after 12 days; mould growth after 8 days.
50	0·5	2·0	10	42·5	100	Weak	do. do.
50	0·5	2·0	15	37·5	100	Good	do. do.
50	0·5	2·0	20	32·5	100	V. Good	do. do.
55	0·5	2·0	6	41·5	100	V. Weak	do. do.
55	0·5	2·0	10	37·5	100	Weak	do. do.
55	0·5	2·0	15	32·5	100	Good	Fermenting slowly after 1 month; mould growth after 12 days.
55	0·5	2·0	20	27·5	100	V. Good	Gas bubbles visible where inoculation had taken place after 1 month; mould growth after 12 days.
60	0·5	2·0	6	36·5	100	Weak	Fermenting after 1 month; mould growth after 12 days.
60	0·5	2·0	10	32·5	100	Good	Fermenting after 50 days; small patch of mould growth after 2 months.
60	0·5	2·0	15	27·5	100	Good	do. do.
60	0·5	2·0	20	22·5	100	V. Good	Fermenting slightly near the surface and mould growth after two months
65	0·5	2·0	6	31·5	100	Weak	Fermenting after 50 days; mould growth after 2 months.
65	0·5	2·0	10	27·5	100	Good	Fermenting slightly after 3 months; slight mould growth after 3 months.
65	0·5	2·0	15	22·5	100	V. Good	No fermentation or mould growth after 3 months; thin layer of sugar formed on surface.
65	0·5	2·0	20	17·5	100	V. Good	do. do.
70	0·5	2·0	6	26·5	100	V. Good	Slight fermentation near surface after 3 months; sugar crystals also separating out..
70	0·5	2·0	10	22·5	100	Weak	do. do.
70	0·5	2·0	15	17·5	100	Good	No fermentation or mould growth after 3 months.
70	0·5	2·0	20	12·5	100	Good	do. do.

TABLE III.

Sugar Grams.	Acid Total.	Malt Extract Grams.	Pectin Grs. of a 4 per cent. Solution.	Water Grams.	Boiled out Weight.	Type of Set.	Remarks.
	Per Cent.						
50	1	2	6	46	100	Not set	Fermenting after 1 month; mould growth after 9 days.
[illegible]	1	2	10	42	100	Weak	do. do.
[illegible]	1	2	15	37	100	Good	do. do.
[illegible]	1	2	20	32	100	V. Good	do. do.
[illegible]5	1	2	6	41	100	V. Weak	do. do.
[illegible]5	1	2	10	37	100	Weak	do. do.
[illegible]5	1	2	15	32	100	Good	Fermenting slightly after 1 month; mould growth after 8 days.
[illegible]5	1	2	20	27	100	Good	Fermenting after 1 month; mould growth after 8 days.
[illegible]0	1	2	6	36	100	Weak	Fermenting after 1 month; mould growth after 12 days.
[illegible]0	1	2	10	32	100	Fair	Fermenting after 1 month; mould growth after 3 months.
[illegible]0	1	2	15	27	100	Good	Not fermenting after 3 months; mould growth after 3 months.
[illegible]0	1	2	20	22	100	V. Good	do. do.
[illegible]5	1	2	6	31	100	Weak	Fermenting slowly, and mould growth after 3 months.
[illegible]5	1	2	10	27	100	Fair	do. do.
[illegible]5	1	2	15	22	100	V. Good	No fermentation or mould growth after 3 months; a thin layer of sugar formed on the surface.
[illegible]5	1	2	20	17	100	V. Good	do. do.
[illegible]	1	2	6	26	100	V. Weak	No fermentation or mould growth after 3 months; a layer of sugar had formed on the surface and crystals were separating out in the jelly.
[illegible]0	1	2	10	22	100	Weak	do. do.
[illegible]0	1	2	15	17	100	Good	No fermentation or mould growth after 3 months.
[illegible]0	1	2	20	12	100	Good	do. do.

appreciable effect on the growth of Penicillium. The "set" of the jelly, however, appears to be a very important factor in preventing fermentation.

Jams were next prepared from plum pulp. The latter was prepared from fresh fruit and put up in vacuum bottles and sterilised. It was used about six months after being put down. The samples were inoculated with wild yeasts only.

[illegible].	Plum Pulp.	Boiled out Weight.	Type of Set.	Remarks.
[illegible]0	45·0	100	Not very good	Fermentation after 7 days, and the fermentation spread rapidly into the body of the jam.
[illegible]2·5	42·5	100	do.	Fermenting after 21 days, but only on the surface.
[illegible]5·0	40·0	100	do.	do.
[illegible]7·5	37·5	100	do.	Fermenting very slightly after 1 month. No worse after 2 months, but sugar crystallising out.
[illegible]5·0	35·0	100	do.	do.

The acidity of the jam varied with the amount of pulp used; that of the 65 per cent. sample was 0·5 per cent. calculated as tartaric acid. The above experiment was repeated, using plum pulp which was more concentrated and consequently gave a better set. The 60 per cent. and 62·5 per cent. samples fermented very slightly on the surface; the 65 per cent. was not fermenting after three months. The 67·5 per cent. and the 70 per cent. jams were not fermenting, but were beginning to crystallise after three months' incubation.

Jams were also prepared from damson pulp, and very similar results were obtained.

The experiments show that the keeping property of jam depends on three factors: sugar, acid, and the "set." The latter appears to play an important part in preventing fermentation. In a well-set jam, it is difficult for the yeasts to get into the body of the jam, and jams prepared here containing only 60 per cent. sugar, but with a good set, have kept for over a period of twelve months and have shown no signs of fermentation. From the above results, however, it is apparent that 65 per cent. sugar is necessary to prevent slight fermentation if wild yeasts gain access to the jam. The prevention of mould growth is a more difficult problem. In the experiments above, *Penicillium Glaucum* did not grow when the sugar content was 65 per cent. or over. On the other hand, samples of jams from all the boilings prepared at the Research Station during the past three years have been stored, and some samples containing 65 per cent. sugar and over have developed *Penicillium Glaucum* when stored in a damp atmosphere. Jams containing over 65 per cent. sugar are too sweet, but apart from that they tend to crystallise when stored, more so if they are prepared from the more acid fruits.

On comparing the results here recorded on the relation between sugar concentration and keeping quality with those obtained by Grove* it should be mentioned that the conditions of experiment differed in the two cases in two important particulars. Firstly,

* O. Grove, *Annual Report of the Agricultural and Horticultural Research Station*, Long Ashton, Bristol, 1918.

the receptacles used by Grove as containers for the solutions under test were not sealed down in any way, the mouths being merely plugged with cotton-wool. This arrangement obviated any risk of condensation of water vapour on the surface of the concentrated sugar solution and the consequent dilution of sugar strength at that point; on the other hand, owing to gradual loss of water vapour through the cotton-wool plug the strengths of the solutions under trial would tend to increase gradually during the course of the experiments, although possibly not sufficiently in the relatively short period of the trials to alter the stated strength very materially. In the Campden experiments, on the other hand, the solutions, gels, and jams were kept in containers closed with screw caps, the result being a tendency for condensed water vapour to settle on the surface of the material under trial and dilution of the stated strength to occur at that point. The recorded results, indeed, show the beginning of fermentation and mould growth to take place there. Hence, the strengths of sugar content stated do not probably apply to the superficial layer of material in the pots during the actual experiment, for appreciable superficial dilution must have occurred from moisture condensation there on cooling after the sterilisation process. Secondly, Grove used for infection purposes yeasts which had previously been growing under conditions of comparatively low sugar concentration, whereas in the present investigation the infection material was taken from media of a very high sugar concentration. The sudden extreme change in the osmotic character of the medium in the former case may have resulted in the growth of the yeast cells being completely arrested, while in the latter case they may already have become acclimatised to growing under conditions of high sugar concentration in the sample of fermenting jam from which they were taken.

There is the further possibility that in the former case the kinds of yeasts used chanced to be sorts which cannot under any conditions tolerate a high sugar concentration, a point which obviously does not apply to the latter case.

Thus the Campden results and those of Grove are not necessarily contradictory. Rather they show the importance of the method under which jams, gels, and syrups are stored. The very high sugar concentrations are clearly required under conditions which permit of moisture condensation in the surface of the material such as occurs during storage in damp places or situations with widely varying temperature or in containers sealed with metal caps or covers relatively impermeable to moisture vapour; whereas under the opposite type of conditions appreciably lower concentration of sugar will probably suffice to restrict fermentation or mould growth.

(Continued from following page.)

tight layer of paper packing in the neck is recommended.

Bottles with patent caps have been quite the fashion for some time now. These caps contain a pad, usually of asbestos soaked in calcium chloride, which absorbs any moisture in the air in the bottle. The principle is excellent, but often is spoilt by carelessness in handling. The lids are not screwed down on the jars after opening or are left exposed to the air for some considerable length of time, with the result that the pads rapidly become saturated with moisture from outside air and so cannot function properly.

There are several of these lids on the market with varying absorptive capacities. It is difficult to lay down definitely what is required, but if the pad absorbs too quickly then it is liable to get saturated too soon when the bottle is opened frequently. On the other hand, a slow absorbing pad may not remove the moisture from fresh air in the bottle quickly enough.

The following figures give some idea of the absorbing powers of certain pads on the market, though the times of exposure to a small quantity of water in a bottle are not all comparative:

		Grams	*Ratio*
A.	after 5 days, water absorbed	17·7	5
B.	,, 5 ,, ,, ,,	10·6	3
C.	,, 5 ,, ,, ,,	21·2	6
W.	,, 11 ,, ,, ,,	7·4	4
X.	,, 11 ,, ,, ,,	12·6	7
Y.	,, 11 ,, ,, ,,	33·6	18
Z.	,, 11 ,, ,, ,,	20·3	11

Temperature and humidity tests can be carried out on a small scale in the laboratory with the use of a hot-air oven, and sulphuric acid solutions of various strengths placed on a desiccator will give an atmosphere of required humidity.

Candy for Export

In many foreign lands atmospheric effects are considerably more severe than in these islands. This fact is of the utmost importance when contemplating the question of export work. Not only may a higher temperature or higher humidity be encountered, but often a combination of both, which very effectively tests the keeping quality of confectionery and the sealing of the containers. The temperatures of ships' holds vary, and stowage near the boilers is not a healthy place for foodstuffs of this description. Furthermore, sea air has a most penetrating effect.

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Climate and Candy

By R. H. MORGAN, B.Sc., A.I.C.,

Confectionery Chemist.

Much has been published in this Journal concerning the effects of abnormal conditions of atmospheric temperature and humidity upon confectionery goods. We consider that the importance of this matter justifies the following discussion, particularly since it records the views of an experienced candy factory chemist.

Temperature Effects

DEALING FIRST of all with the question of temperature, its natural effect is to soften candy. High temperature tends to overcome the rigidity of a sweet, and, in the extreme, the result is that the individual sweetmeats coalesce to form one solid mass at the bottom of the container.

Such an ill-effect can be counteracted by increasing the solidarity of the confection. The water content must be reduced to the minimum possible amount, and this can be carried out by boiling the sugar to a higher temperature, or by using an efficient type of vacuum machine. When the moisture content is reduced, the high solid ratio of the resulting product resists the softening tendency of high temperatures.

The melting point of dry sugar is 160° C., or 320° F., and it would follow naturally that the nearer this temperature is reached when boiling, the better would be the result. Unfortunately, however, a solution of sugar is liable to decomposition at temperatures lower than 320° F., and allowances have to be made on that account. The incorporation of glucose syrup considerably helps to maintain the required rigidity of sweets, and there is no doubt that the dextrin present plays a great part in this action. A further advantage of dextrin will be mentioned later.

Humidity Effects

The effect of humidity on boiled sugar is clearly evidenced by the appearance of sweets after they have been left exposed to the air for a short time. They become wet. Boiled sugar has a tendency to absorb moisture. The peculiarity of sugar in this condition is usually ascribed to the presence of invert sugar—more particularly lævulose. Even a small proportion of lævulose will produce this effect. However, sugar in the ordinary way exhibits some affinity for water, for icing sugar often becomes lumpy on keeping even in a loose condition.

The dextrose in sweets, introduced by the use of glucose syrup, is another contributory factor to the absorption of moisture. The vitreous sugar-glucose mixture contains but little moisture and yet dextrose has a great tendency to form dextrose hydrate by absorbing a molecule of water from the surrounding atmosphere—$C_6H_{12}O_6 + H_2O$.

Apart from rendering confectionery wet—and, of course, sticky—humidity usually brings about crystallisation or "candying." The dextrose hydrate mentioned above is of a definite chemical composition and it is of a crystalline nature. A sweet exposed to the atmosphere usually feels comparatively dry to the touch after its surface has become covered with small crystals of the hydrate. It is reasonable to suppose that this superficial crystalline formation induces a sympathetic action in the remainder of the substance—especially as, after all, sugar in a vitreous state is in a condition of unstable equilibrium—consequently, the crystallisation works through to the centre.

It is interesting to note that sometimes the interior crystallises as a whole or in parts. Often the candied portion can be broken off, leaving a plane surface. Can this be attributed to a certain rearrangement of atoms to form a crystalline structure, bearing in mind, of course, the possible effect of other substances present?

The dextrin of glucose, apart from its rigidity effect, is to-day regarded as a protective colloid which tends to prevent the absorption of moisture by the sugar molecule.

From the manufacturing point of view, in order to obtain rigidity and to counteract humidity effects, it is essential to retard as much as possible the production of invert sugar. The sulphur dioxide present in the raw materials, sugar and glucose, acts as a drier and hardener, owing to its affinity for water; and other weak acidic salts, such as acetates, phosphates, citrates, etc., can be used to prevent inversion. The effect of the water used is important, more so, perhaps, than is generally realised. The use of glucose syrup has already been mentioned.

Packing

The condition under which sweets are packed is important. It follows, naturally, that airtight containers are necessary, but it is not always realised that the damage is done sometimes before the goods are put into the tins or bottles. The confectionery must be dry when packed. This is essential, otherwise a film of moisture, indistinguishable to the touch, will bring about the above-mentioned crystallisation effect however carefully sealed the packages may be. While sweets cannot be packed when hot, it is advisable to do so before they become thoroughly chilled. This is important on days of high humidity, and the advantages of a humidifying plant are obvious.

With regard to the packages themselves, tins should be carefully examined, especially along the seams, in order to see that they are airtight. With ordinary bottles the stoppers must fit securely, and a

(*Continued on previous page.*)

Recipes

Stewed Tongue (Zungen-Ragout)

(A German Recipe.)

A good salt tongue is cooked, cut into slices, and put into tins. A delicious sauce is made from mushrooms or truffles, with the addition of a small quantity of Madeira; it is thickened with a little flour and a small quantity of butter, together with "Anamalin—C.B.," to the amount of 2 grms. for each kilo of mixture. Pour this sauce over the slices of tongue. The tins are sterilised at 117° C. for seventy minutes, exclusive of the time required for heating and cooling.

Garnished Roast Beef

(A German Recipe.)

To obtain a really juicy roast beef, take plenty of kidney fat that has been put in cold water overnight, cut it into small pieces, and melt in a pan. Into this put the beef which has been sprinkled with fine salt. Place in a very hot oven, and let it roast, basting it constantly for three-quarters to one and a half hours, according to the size of the piece, and so long as the meat remains red inside. Then cut into small pieces, put into tins, and pour the gravy over it. For garnishing, use mushrooms and gherkins which have been stewed in butter or stock (asparagus tips, carrots, cauliflowers, or other cheaper vegetables can also be used). With gherkins, there is a danger that the beef will lose some of its flavour. The tins are sterilised at 100° C. for an hour.

Christmas Pudding

INGREDIENTS:

15 lbs. flour.
4 ozs. salt.
4½ ozs. ground ginger.
10 ozs. cinnamon.
4½ ozs. mace.
5 ozs. ginger.
14 lbs. raisins.
14 lbs. sultanas.
10 lbs. bread crumbs.
17 lbs. currants.
18 lbs. demerara sugar.
2 lbs. lemon peel.
16 lbs. suet.
7 lbs. apples (chopped).
1 gallon milk } whisked
24 eggs } together.
2 lbs. orange peel.

Yield, 139 lbs.

A View of the "Food Manufacture" Analytical and Research Laboratory.

Another View of the "Food Manufacture" Analytical and Research Laboratory.

Preparation of Fruit. — The currants are dry cleaned (in a Ducksworth or similar machine) washed and carefully picked over to eliminate stones. The sultanas are dry cleaned and washed and the raisins are stoned by machine.

Bread and Suet.—Only the crumb of the bread should be used and all the skin should be carefully removed from the suet. These two ingredients are then chopped together and mixed with the fruit and other ingredients, the mixture being kept dry. One gallon of milk is now whisked with 24 eggs and poured on to the dry mass, and the whole thoroughly mixed either by hand or machine.

Cooking.—This should be done in a damp steam atmosphere, and a 2 lbs. pudding will require about 4½ hours in all in the retort. The atmosphere should be gradually raised during the first hour to 220° F. and maintained at this temperature for 2½ hours, gradually falling during the remaining hour until the pudding is practically cold.

The baking cloth should be removed at once, and the pudding be placed in a warm, dry oven for at least 24 hours. The puddings should be stacked in such a way that there is a free access of air (if possible in an actual current of air). This is necessary to avoid the possibility of the pudding going mouldy. They should be stacked for at least two weeks before being packed up for despatch.

Mincemeat

INGREDIENTS:

32 lbs. apples.	28 lbs. sugar.
15 lbs. sultanas.	9 lbs. suet.
9 lbs. peel.	3 ozs. cinnamon.
4 ozs. acetic acid.	3 ozs. mixed spice.
2 ozs. oil lemon.	3 lbs. rice flour.
34 lbs. currants.	4 ozs. tartaric acid.

Yield, 124 lbs. approximately.

The apples should be peeled and cored, and the 32 lbs. will yield 24-25 lbs. These are mixed with the sultanas and peel (which should be previously finely chopped). The acetic acid and oil of lemon is then added, and all chopped together in a rotating mincer. Finally, the remaining ingredients are mixed in either by hand or machine; the yield will be about 124 lbs. The mixture should be allowed to stand at least all night before filling in jars.

If the mixture is too firm or it is desired to cheapen it, up to 14 lbs. of glucose can be added.

Tomato Sauce

An excellent tomato sauce was prepared at Campden as follows: Ninety-six pounds of tomatoes were cooked in an aluminium pan until soft enough for pulping. They were then put through a hand pulping machine, with a sieve of monel metal. The pulp was returned to the pan and cooked to a thick purée; the following were then added:

1 gall. distilled vinegar.	8 lbs. sugar.
2 ozs. cinnamon bark.	12 ozs. salt.
2 ozs. allspice.	2 ozs. Paprika pepper.
2 ozs. Penang clove stalks.	16 ozs. (fluid) Tarragon vinegar.
1½ ozs. mace.	1 gram Cayenne pepper.

The spiced vinegar was strained before adding. The mixture was again cooked to a thick cream with constant stirring, and the product was poured hot into 8 oz. sauce bottles, which were heated at 170° F. for thirty minutes.

In American canning practice, the tops are sliced off and the skin and core so roughly removed that considerable pulpy matter adheres. It is customary to use these trimmings to make a somewhat lower grade of pulp, and if the whole fruit is sound and ripe, there is no reason why a given batch of tomatoes should not yield both the canned product and a good grade pulp for making sauce.

Correspondence and Enquiries

Correspondence

To the Editor of FOOD MANUFACTURE.

DEAR SIR,

We are all trying to spread reliable information about gelatine. This entails much painstaking research work before it is finally offered for publication in the technical journals. Who ever heard of gelatine having its maximum physical properties at pH=4·7, and what product, in which gelatine is used, is so much on the acid side as pH=2? The nearest is the jelly powder at pH=approximately 2·8.

Now, as a matter of fact, the pH of the gelatine itself is governed in the final analysis by the pH of the mix to which it is added. This is because the percentage of gelatine in the average food product is so small (0·5 to 3 per cent.) that it cannot appreciably affect the 97 or more per cent. of the other ingredients. The important point is to adjust the manufactured product to its most effective pH relative to the manner in which the gelatine is desired to function.

Sincerely,
M. BRIEFER.

ATLANTIC GELATINE COMPANY,
WOBURN, MASSACHUSETTS.

To the Editor of FOOD MANUFACTURE.

SIR,

With reference to the criticism of my statement *re* pH and maximum gel strength of gelatine, it is apparent Mr. Briefer has seriously misread my actual wording, for his criticism is based on words which do *not* appear in my article. The words "physical properties" are his own entirely. If he will do me the kindness to criticise my actual statement by using my original wording, "Maximum gel strength," instead of that of his own, his inquiry would read: "Whoever heard of gelatine having its maximum *gel strength* at pH 4·7?"

To answer this I need go no farther afield than an article published by Mr. Briefer himself in the April issue of *Industrial and Engineering Chemistry*. If he will refer to page 410 he will see there four graphs of gel consistency against pH which show a maximum round pH 4·7. Furthermore, if he will turn to page 400 of the same issue, he will find a table of results of workers of the New York Agricultural Experimental Station, which shows that not only does the gelatine approach its maximum gel strength round pH 4·7, but that its *minimum* is at pH 2. Moreover, they state that Sheppard and Sweet (*J. Amer. Chem. Soc.* 43, 539, 1921) obtained a maximum in pH-gel strength curve at pH 4·6.

As to his remark: "What product is so much on the acid side as pH 2?" I would remind him of its irrelevancy, as I stated the *gel strength of gelatine* was weakest at pH 2 without any reference to its uses in confectionery at this acidity.

The concluding information which Mr. Briefer gives *re* the pH of the batch governing the pH of the gelatine is so obvious that to reiterate it in any article would reflect on the intelligence of the reader.

I think that these points substantiate my original wording, and while assuring Mr. Briefer that we in England are fully aware that gelatins vary among themselves and many factors must be considered when dealing with pH and gel strength, I feel that he has failed to realise that my quotation was given in a non-scientific article as a simple explanatory example of the effect of pH on gelatine.

When one makes a general broad statement that the earth is round it is not customary to include a detailed account of Einstein's Theory of Relativity either to prove or disprove it.

Yours truly,
J. V. BACKES.

Enquiries

The following are extracts from letters we have lately received. We shall be glad to put interested parties in touch with the writers, or to insert replies in the Correspondence columns.

39. Wanted, the name of a firm which makes machines for the pressing and clarification of pomace.

Scientific Control in the Flour Milling Industry

By C. W. HERD, B.Sc., F.I.C.,

Research Chemist, Messrs. Woodlands, Ltd., Dover.

The article below is of great importance to every user of flour. Another article of equal importance by the same author was "Flour as a Raw Material," which we published in July of last year. These articles make it clear that the miller is making a really serious effort to bring his processing operations, and hence the quality of flour, under scientific control. This is all to the good of the baker, for he can rely on greater regularity in the flour and can obtain exact information as to the qualities and properties of the various grades. Also, the miller's laboratory can render much valuable information and advice to the baker.

THE CONVERSION of the wheat grain into flour is to the lay mind a simple process of grinding and nothing more; it is probably regarded as the problem of the engineer and not as entering into the domain of the chemist. Engineering has made many improvements in the process of milling, and has brought it up to a fine art, and it may be said that many people, who have not seen the inside of a flour mill, do not realise the complicated nature of the modern grinding plant.

Flour is one of the purest food products manufactured throughout the world, and the tendency of modern milling methods has been to greater and greater purity. Foreign seeds are removed, and the wheat grain is scoured and washed before it passes to the grinding rolls or mill proper. Thenceforth the process is a continuous one and the milling stocks proceed through a predetermined "flow," from machine to machine, until, finally, there emerge the three chief products—viz., flour, sharps or middlings, and bran. In view of the very mechanised nature of the process, it is small wonder that the milling industry has been one of the last to realise the importance or even the necessity of scientific, other than engineering, control. However, the flour mill chemist has appeared and is slowly consolidating his ground; in America more advance has been made than in this country, but throughout the world the utility of the application of chemical principles is gradually being realised. This is evidenced by the recent International Conference on Flour and Bread Manufacture held at Prague at the invitation of the Czecho-Slovakian Government. At this meeting a large number of the leading cereal chemists of the world were present, and such an interchange of ideas cannot fail to arouse interest in the scientific side of bread and to stimulate further activity amongst cereal workers.

In view of the infancy of the science of cereal chemistry, little uniformity has yet been reached as to the best methods of analysis and control in the mill—in fact, this is one of the first problems to be attacked collectively as a result of the above-mentioned Conference. Some idea will, however, be given of a system of analysis and control, which to the author's knowledge, has given satisfaction in England.

The industrial chemist's work may be divided into three departments:

1. Investigation of raw material.
2. Control during the manufacturing process.
3. Examination of the finished product.

The cereal chemist is no exception, and the work of the mill laboratory may be considered under these headings.

Control of Raw Material

The raw material is, of course, the wheat grain, but it need not be imagined that the problem is very simple because only one (or perhaps two) botanical species is involved. English millers receive wheat from all parts of the world, and the characteristics vary appreciably with the country and conditions of growth. Every sample of wheat arriving at the mill should, therefore, be sampled and examined for moisture and protein contents.

The determination of moisture is not quite so simple as it sounds, because, owing to the complex nature of the grain, different ovens and temperatures give slightly different results. However, once the laboratory has decided on a type of oven and a certain temperature of working, so long as conditions are maintained constant, all results will be comparable and give the necessary information. These moisture determinations are required, because, as many will imagine, the grinding of the grain—*i.e.*, in essence the separation of the flour from the bran, takes place best at a definite moisture content.

The protein content of the wheat is of great importance, and in America high protein wheat is held at a premium. A high protein wheat is reflected in the quantity of protein or gluten in the flour made from it, and the chemist should endeavour to keep this latter figure at a fairly high level. A knowledge of the protein content of all wheats in the blend enables the miller to predict and control the protein content of his flour.

As has been pointed out in a previous article (I. 5. 65), the diastatic activity of a flour is of importance, and it would be of great service to the miller and chemist if this could be predicted from an examination of the wheat, but as far as the author is aware, there is no satisfactory method at present available for doing this.

Again, the wheat may become sprouted in the field, without it being sufficiently obvious to the eye; a chemical test for the detection of this "insipient"

sprouting would be of great use, and this subject is in urgent need of investigation.

Conditioning

The first process during the manufacture of flour, which claims the chemist's attention, is that of "conditioning." As mentioned above, each grain of wheat must be got into a good grinding condition before it goes on to the rolls, thus ensuring the best possible separation and the minimum expenditure of power. This change in condition is brought about by the simultaneous application of heat and moisture, and the process should be carefully watched and controlled by moisture and temperature determinations —thermograph charts should be obtained of the wheat itself, so that any irregularity may be checked, as excessive heat may be dangerous. Much has been written about this conditioning process, but the question of ultimate effect is a very controversial one. Tague, in America, and Kent-Jones, in England, have advanced evidence that the effect is one which involves only the physical structure of the grain, and that the purely chemical changes occurring are so slight as to be practically negligible. From a practical milling point of view the aim is to add a sufficient quantity of water, so that, in the heating section of the conditioning plant, a uniform distribution of moisture is obtained throughout the endosperm and at the same time the bran is toughened. Few mills can treat each wheat individually, so they are frequently classified as hard, medium, and soft, depending on their physical characteristics, and these classes are conditioned separately—the chemist knowing the necessary moisture content in each case for the best milling results.

If the stocks from each machine in the mill be examined (*Modern Cereal Chemistry*, p. 200), it will be found that they vary both physically and chemically, so that the value of the composite flour will depend upon which machines are included therein. This is of fundamental importance where "divided" flours are made and the mill chemist has to understand the characteristics of the stock from each machine, so that advice can be given when flours are required for special purposes.

Owing to the continuous nature of the process and to the fact that the final flour is composed of the stocks from the various machines, the possibility of control during manufacture is limited, and the chemist's chief work lies in the examination of the finished article. As many tests should be carried out as are necessary to determine its commercial value, its regularity, and its suitability for the purpose intended.

Moisture

The first test, and the only one that can be said to be almost universally employed, is that of the moisture content of the milling stocks; if the conditioning process has been carried out correctly, it will be found that there is a fairly uniform distribution of moisture throughout the endosperm, and that a clean and bright flour is obtained, due to a better physical separation of the bran from the flour. Moisture control in the manufacturing process is o paramount importance.

Protein

The value of the protein test must be emphasized As has been shown, the quantity of protein in every wheat purchased should be determined, and then the protein content of the flour observed and compared with that calculated from the wheat blend. The protein is determined by an ordinary Kjeldahl nitrogen test, using copper sulphate as the catalyst, the conversion factor from nitrogen to protein usually employed being 5·7. If the flour has a good protein content (say 10·5 per cent.) this will be appreciated by the baker during the handling of his doughs, for it gives a greater "freeness" and more vim in working.

Gluten

Closely related to the protein content is the crude gluten content. This crude gluten is obtained by washing a dough under a stream of running water until all the starch has been removed. This is not an accurate test for quantity, as the amount obtained varies with the temperature of the water and particularly with the idiosyncrasies of the worker; gluten is approximately 80 per cent. protein, and, of course, part of the soluble proteins are lost during the washing. The value in this gluten washing lies in the handling of the gluten, which gives useful information as to its physical quality. The writer examines the gluten for its elasticity, its toughness and spring, and also to see that it does not tend to break short under tension. With experience, these characteristics give the chemist a very good idea of the quality of the gluten, which is reproduced in the baker's dough.

Mineral Matter

The amount of mineral matter should also be determined regularly on all grades of flour from the mill. It is well known that the outside of the berry contains more mineral matter than the centre of the grain—this determination, therefore, gives a check on the satisfactory working of the mill and is an index of the grade of the flour. This ash estimation can be conveniently made by igniting a known quantity of the flour in a muffle furnace at 600° C until no further loss in weight occurs on prolonging the heating.

Sugar

The manufacture of bread depends on the fermentation of the yeast, so that it is necessary to have a sufficient quantity of sugar as food; there is not enough originally present to produce the CO_2 required to distend the dough, but the working of the diastase in the flour accounts for an additional quantity. If the diastatic activity of a flour is low, then too little sugar will be produced, with the inevitable result that the fermentation will slacken and in some cases eventually stop almost entirely. It is therefore of importance to determine the amoun

of sugar originally present in the flour, plus that produced during an incubation at fermentation temperature for an arbitrarily fixed time. This is actually done in cereal laboratories as a control on the power of the flour to support the working of the yeast and produce gas up to the baking of the loaf. Further, a plentiful supply of sugar at the end of the fermentation period will ensure a satisfactory dextrination in the oven and consequently a good golden brown colour on the crust.

Hydrogen Ion Concentration

It is to be anticipated that the principles of hydrogen ion concentration would have been applied to flour; this is so, but the importance and usefulness of the pH of a flour have not yet been proved. The practical miller and baker have yet to learn the effect that this factor has on his product or process, but it must be remembered that the buffer action of a flour may be one controlling feature in the "ripening" of doughs, since fermentation is accompanied by the production of acid. The pH of a flour can readily be determined by the use of the quinhydrone cell, using either a suspension or a filtered extract of the flour in question.

Colour

The colour of flour is of primary importance, and several methods have been tried for the evaluation of this; the Lovibond tintometer was not very successful owing to the variation between different observers, and the Pékar test (comparison of flattened slabs of flour after dipping in water) does not portray very correctly the appearance of the final loaf, owing to the interference of external factors, such as the size of the granules and the effects of the oxidase present in the flour. Recently, investigations have shown that the colour of the bread can be divided into the two factors: (1) the brightness, (2) the yellowness, and that these two effects are dependent upon two different pigments. The yellowness is due to the carotin, and the dulness to the pigment of the bran, stated by Palmer to be xanthophyll. These two pigments can be extracted independently by solvents and their values determined numerically by the usual principles of colorimetry.

Dough Testing

It has long been known that different flours have different baking properties, dependent upon the physical characteristics of the doughs and of the gluten obtained from them, and not determinable by direct chemical examination. This has resulted in various devices for the measurement of the physical properties of glutens or doughs; among these may be mentioned Jago's aleurometer and Chopin's extensimeter, but these have not had general adoption. The progress of colloidal chemistry has attracted the interest of cereal chemists and a distinct advance in the understanding of doughs has resulted from the application of these principles. Viscometry has naturally been suggested as a possible means of the measurement of the physical properties of a flour or dough; Sharp and Gortner have carried out extensive studies in America, using a McMichael torsion wire viscometer; Kent-Jones, Denham, and others have favoured the Ostwald type of viscometer. Recently an instrument called a "penetrometer" has been suggested for the measurement of the water-holding power of a flour or dough.

Baking Tests

A great deal of information is thus obtained from a chemical and physical examination of flour, but naturally the final and conclusive test is the actual baking test. An experimental test baking should be carried out regularly in every mill control laboratory; it is advisable that these should be conducted by a skilled baker, who from his experience can correlate the results of a small batch to those which would be obtained on a commercial scale. In practice the baker's first consideration is the way the dough behaves from the time it is made until it is ready for the oven; the dough has to stand on its own in the trough and again when it is moulded into shapes and is "prooved," and it is essential that such a power to "stand up" should be available. A well-conducted baking test will give useful information thereon, for a study of the small doughs will reveal any tendency to "run out." It must always be borne in mind that a small defect in a test baking will be magnified commercially. Many mill test bakers are accustomed to judge the baking qualities of a flour by the volume of the loaf made, and not from a study of the dough; this procedure is very misleading as the volume of the bread is very largely controlled by the baking and fermentation conditions—thus, five minutes one way or the other during the final "prooving" period can make a very appreciable difference to the size of the loaf.

The combination of a chemical examination and a scientifically conducted baking test gives a very useful control on the regular and satisfactory running of a flour mill.

Containers for Displaying Foods

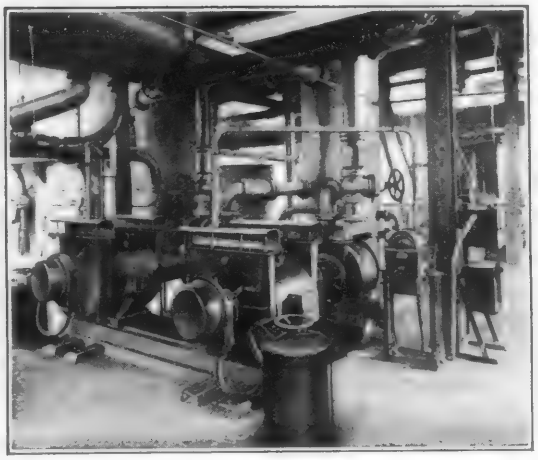
THE success of the food retailer largely depends upon the method in which he displays his food. Articles displayed on the counter without sufficient covering are liable to deterioration by dust, flies, and other contamination, whereas if the food is displayed in attractive cardboard containers the retailer is sure of increased sales, and the purchaser knows that he is buying pure and fresh food.

Boxfoldia Limited, of Birmingham, at a recent exhibition gave a display of the good and bad methods of displaying food for sale. It is worthy to note that recently many firms have introduced this system into their business, and let us hope that others will follow their good example.

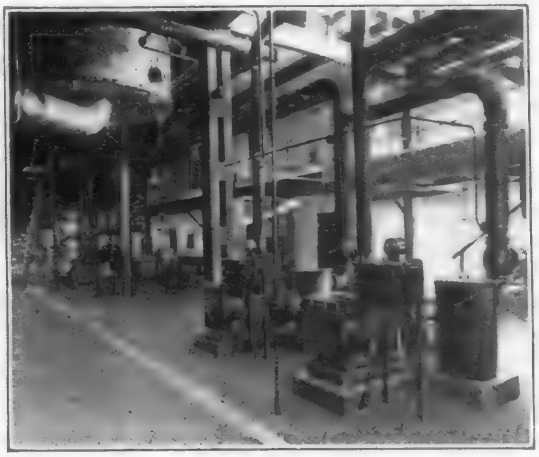
Power Economy in the Food Factory

By "KILOWATT"

PART I



Two 95 h.p. Pipe Ventilated G.E.C. Slip-ring Motors, 725 r.p.m., Driving Carbonising Plant in a Beet Sugar Factory.



Two 16 h.p. Pipe Ventilated Squirrel Cage G.E.C. Motors Driving Thick Juice Pumps in a Beet Sugar Factory.

THE USE of an economical form of motive power for driving plant in a food factory is of paramount importance to owners of such establishments, and if it can be shown that the adoption of one particular form has proven advantages over others and at the same time is more economical, then careful consideration must be given to its claims if maximum efficiency with minimum costs is the objective of the management.

Electricity as a form of motive power claims to possess many advantages over steam, oil, and gas, and its medium of application, the electric motor, also claims to confer on the user benefits which no other form of prime mover possesses. To a very large extent these claims are substantiated by the remarkable increase in the use of electricity for power purposes during recent years in almost every industry, and so great has become this demand that public electricity supply stations all over the country have been compelled to extend their generating plant in order to deal with the increased load.

The first question to arise in the mind of the prospective user of electric power is whether its adoption, involving perhaps a change over from existing methods, will reduce operating costs and improve conditions. In answering this question one has necessarily to consider whether it is cheaper to purchase power from the local supply mains or generate it privately at the factory.

Private Generation

Although the decision of the manufacturer is in the main governed by a comparison between the price at which electricity can be privately generated and the price at which it can be purchased, there are certain other factors which have to be taken into consideration arising from the individual conditions of each factory. Such items as capital expenditure, depreciation, available space and future expansion all pertain to each particular case and must, therefore, receive their due share of attention. Steam being required for many processes in the manufacture of food, irrespective of the form of motive power employed for driving the machinery, the case for private generation of electric power in the food factory receives considerable support, as by generating the steam at a higher pressure it can be first passed through an engine or turbine driving a generator and then exhausted into the heating mains at the pressure necessary to give the desired temperature. The difference in fuel consumption in raising steam at a high pressure is very little extra to that required for medium pressures. A glance at any steam table will reveal the fact that the total heat of steam at 300 lb. pressure is only 22 British thermal units above that at 100 lb. pressure. Take the case of a factory requiring steam for process work at a pressure of anything between 10 and 60 lbs. If high-pressure boilers are used, together with engines or turbines exhausting at the required pressure, power can be obtained at a very low rate. This proceeds from the fact stated above that a given weight of steam at a high pressure only requires 2 per cent. more coal than that needed to produce medium pressure.

The Cost of Private Generation

The actual cost per unit by private generation is represented by the total of a number of items which may be set out as follows:

1. Interest at say 5 per cent. on capital invested in private plant.
2. Depreciation—10 per cent. is a very fair figure.
3. Maintenance—say 2½ per cent.
4. Fuel and lubrication.
5. Labour.
6. Insurance.

And in certain individual cases:

7. Rent of space occupied by generating plant which would otherwise be utilised for productive purposes.

Items 1, 2, 3, and 6 are not difficult to assess. With regard to No. 4, the cost of fuel chargeable to power production is very small, as steam being required for process work it can also be utilised for driving a turbine or engine coupled up to an electric generator. The use of such a combined power and heating plant is a very strong factor in favour of the economical production of electricity by private plant.

Item No. 5—Labour—depends, of course, to some extent upon the size of the plant installed, but as most factories using electric drive have a skilled engineer in charge of the existing electrical equipment the cost of additional labour is not a serious item. Those establishments at present using some other form of motive power and contemplating the generation of electricity would probably have to employ one or more electrical engineers. Here again, the assessment of this item is not a difficult matter and in many instances may prove to be quite small.

The question of assigning a monetary value to the space occupied by the generating plant (Item No. 7) is one which must be determined by the management of each individual factory. In some instances, where space is strictly limited, a figure may reasonably be adjudicated. On the other hand, where ample accommodation is available and there is little likelihood of the space becoming indispensable for productive work this item of charge may well be omitted.

Capital Costs

As regards the capital cost of installing private generating plant, this is frequently an obstacle in many industries; but the food factory is in a more fortunate position, inasmuch as little or no capital or operating costs are involved for steam-raising plant to drive the generators. The boilers are required for the production of steam for heating, whether the power plant is installed or not, and stokers have to be there to fire the boilers to raise the steam for heating.

If for any reason the existing boiler plant could not be adapted for high-pressure work then it becomes a question of comparative costs again between that of installing new boiler plant and the introduction of an oil or gas engine to drive the electric generating plant. In addition to the cost of the steam engine or turbine (or gas or oil engine) we must also consider under the heading of capital costs foundations and extra building work, generating units, wiring, etc.

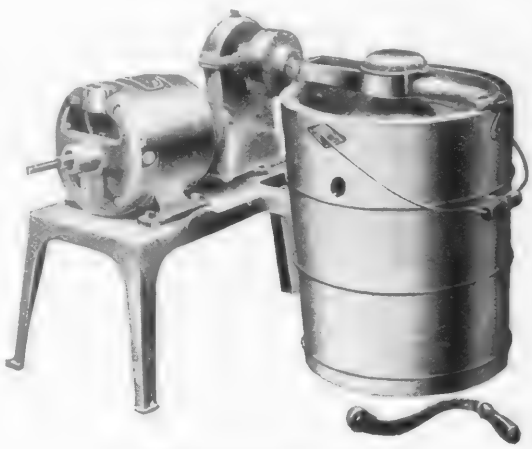
While the use of steam for process of heating purposes enhances the overall economy of the private power plant, there are further factors to be considered. Although capital costs should be a minimum, the units installed must be of sufficient reliability and capacity to obviate the need for standby plant. Their operation must be easy and cheap, and the load factor of the plant, which plays an important part in the economy or otherwise of the installation, ascertained.

The above remarks briefly set out the questions involved in the consideration of operating private generating plant and are not intended to influence the power user unduly against obtaining a supply of electricity from an outside source. At the same time it must be borne in mind that the possession of a fair-sized steam-raising plant, as in the case of the food factory, goes a long way towards economical private generation, particularly where it is not necessary to add to the existing boiler capacity.

There is one other question arising out of this subject of private generation. It becomes necessary sometimes to reorganise an existing independent power plant, and the question arises as to whether it should be closed down and a supply taken from the local supply station, on account of cheaper power. In this connection there is a tendency to compare the performance of old plant with the results being obtained in an up-to-date power station to the disadvantage of the former, but this is not a fair comparison, bearing in mind the great improvement possible in most cases by modernising an old plant. If a private plant by reorganisation can generate at a figure even approximating to the central power station, it is likely to become an economic proposition, because the public supply station is saddled with heavy distribution costs which it has to pass on to the consumer.

We will consider next month the case for taking a supply of power from the public mains.

(To be continued.)



Electric Ice-Cream Mixer.

The Salmon Canning Industry

By ERNEST D. CLARK, M.A., Ph.D., DIRECTOR,

AND

RAY W. CLOUGH, M.A., Ph.D., CHEMIST,

North-West Branch, National Canners' Association, Seattle, Washington, U.S.A.

The present article concludes this important and original series, in which the life-history of the salmon, the methods employed in its capture, the plant and processes used at the Western Canneries, the characteristics of the different species of the fish, and the food value of canned salmon, have been described with a wealth of detail.

PART V.

Laboratory of the National Canners' Association at Seattle, U.S.A.

Preparation for Salmon Canning Season in British Columbia

OWING TO a considerable change in circumstances there is a great deal of uncertainty in the prospect for the forthcoming salmon packing season in British Columbia, according to a report of June 2, 1928, from L. R. Blohm, at Vancouver. Extensively amended regulations in the matter of fishing will, in all probability, make considerable difference. It has not yet been definitely decided, since merger of the B. C. Packers and Gosse Packing Company, as to the scope of the operation of these companies. However, preparations are being made for this season at almost all canneries, and from present indications practically all canneries will be in operation again. Fishing and packing will get fully under way with the opening of

the sockeye season on June 20. Few predictions are being made as to the possible size of the salmon run other than that the cycle year points to a big pink season on this coast.

The new regulations tending to reduce the salmon pack this year include that one whereby fishing by all methods is prohibited within one-half mile from creeks as against the former restriction of 200 yards; also that regulating the size of purse seines to a minimum depth of 250 3½ inch meshes and a minimum length of 150 fathoms and a maximum of 200 fathoms instead of 500 fathoms allowed in 1927. Also one power-boat may be used this year in the operation of the seine where formerly two gas-boats were permitted.

It is stated on reliable authority that the Dominion Government will consider the advisability of an appeal to the Privy Council from the judgment of the Supreme Court in the recent British Columbia Fisheries case, the latter part of May, 1928. The Supreme Court held unanimously that the regulation of fish canneries is a provincial and not a federal matter and that, therefore, the Act requiring Dominion licences is *ultra vires*, by reason of encroaching on the provincial field. The cause of the trouble has been the extensive incursion of Japanese residents in the British Columbia fisheries. An attempt had been made by the Department, favoured by the Marine Committee of the House, to exclude the Japanese, but the majority of the court held that in British Columbia a subject, otherwise qualified, whether native or naturalised, yellow or white, was entitled to a licence.

The decision of the Canadian Supreme Court that the Provincial and not the Dominion Government can collect cannery licence fees on this coast may add substantially to the fisheries revenue of British Columbia, but will not affect the control and administration of fisheries in any way. Whether the Provincial Government will actually increase its licence fees to canneries, which now net the Government some $80,000 annually, is still a matter of speculation. The annual present Provincial licence fee for each cannery is $100, just twice the Dominion fee.

In addition to the cancellation of the Dominion licence fee the Supreme Court ruling upsets the Federal Government's pack tax of four cents a case for all sockeye packed on this coast, and two cents for every case of other kinds of salmon. This tax has run as high as $300,000 in recent years, and last year amounted to about $100,000. Now that the federal tax is abolished it will be for the province to decide how it shall adjust its collections, as it controls the whole revenue field under the new ruling.

The idea that the ruling involves the control of fisheries in any way is entirely erroneous. The Provincial Government under the ruling has exclusive power to issue cannery licences, but it has no power to refuse to issue licences, when they are wanted. If it could refuse to issue them it would have a wide power of control over fishing. All it can do under the new decision is to exercise the right of collecting licence fees exclusively, while the Dominion is barred from this act of revenue, but must continue to bear the cost of administering fisheries.

Regulation and Control of the Industry

Of late years the salmon canning industry of the United States has been perhaps more carefully regulated than most food-producing industries. The U.S. Bureau of Fisheries regulates the place where, the time when, and the gear by which the salmon may be taken. The U.S. Bureau of Chemistry sends its inspectors to the canneries to see that the fish are properly canned and then inspects the finished product in the warehouses where it is stored. The U.S. Public Health Service inspects the men for communicable diseases before they leave for the canneries in the spring. Besides governmental regulation the salmon packers have voluntarily formed themselves into the Association of Pacific Fisheries, an organisation which collects and distributes information and statistics of interest to the industry. They also maintain a branch office and laboratory of the National Canners' Association at Seattle.

Scientific Investigations

This laboratory was established in 1919 and began at once an extended study on the composition of canned salmon to determine its food value. Over 700 cans of salmon, including each of the five species of Pacific salmon and the steelhead trout from every important American canning district, were analysed, together with a few cans of Atlantic salmon. It is, perhaps, the most comprehensive study of a single group of fish which has ever been attempted.

Recognising that the industry should have an adequate, and logical, method for the examination of canned salmon to determine its quality and condition, a very careful study was made of the five species. This study brought out the changes which took place in the flesh of the salmon during the spawning migration, when the quality gradually deteriorates, the fat content decreasing, the water content increasing, the flesh losing its colour and growing softer in texture. Fortunately most of the salmon are caught early in the migration before any appreciable deterioration has taken place. All these changes leave their marks on the canned fish, which may be interpreted by the trained observer. A number of other studies were also made and a list of these is given at the end of this article. These studies gave the laboratory proper bases and information for the examination and critical judgment of parcels of canned salmon about which information was desired by the packer or which were

being offered for shipment. Much of the salmon shipped to the Philippine Islands, to Central and South America, to several European countries and Great Britain is now examined by this laboratory, the sales contracts specifying "National Canners' examination." Hundreds of thousands of cans have been examined in the last eight years and a careful record kept of each, so that now a vast amount of data have been collected. From time to time these data are gone over in order to learn more about canned salmon and to see if the products and the methods of packing are improving. *The results show that the salmon canners are putting more and more emphasis on quality and less on quantity in their canning operations.*

Economic Importance of the Industry

Beginning in 1864 with a pack of only a few hundred cases, the industry has increased to an average yearly pack of over 8,000,000 standard cases consisting of 48 one-pound cans or the equivalent, with a total in some individual years, for instance 1926, of over 10,000,000 cases. The original small cannery has been replaced by about 260 canneries, practically all of which pack several times as many cases of salmon as the first cannery did. One cannery has eighteen complete lines of machinery and is capable of turning out over 15,000 cases of salmon a day. Unfortunately, not enough salmon can be obtained to operate this plant to capacity. There are numerous plants of four or five lines capable of producing 3,000 to 4,000 cases a day. The canneries alone represent an immense investment, the total amount of which is hard to estimate. The value of the 133 *plants* operated in 1926 in Alaska alone is placed at $16,000,000, operating capital at $20,000,000, wages paid at $11,116,000, together with vessels and fishing apparatus at $13,534,000. British Columbia has between fifty and sixty plants, some of which are among the newest and finest in the industry. Their annual pack has averaged over 1,400,000 cases for the last ten years, culminating in a record pack of over 2,000,000 cases in 1926. It is difficult, or practically impossible, to estimate the total investment represented by the 260 or more canneries operated around the North Pacific Ocean.

Beginning with only a very few employés, the industry now employs a small army of some 50,000 or 60,000 people, about 22,000 being employed in Alaska alone. Several times as many would be required were it not for the wonderful machines which have been invented. Statistics are not available covering the industry in all sections, but they are very complete for Alaska. In Alaska alone over sixty million dollars are invested in the canning of salmon, including plants, vessels, fishing gear, and operating capital. It is, therefore, probable that the industry as a whole represents an actual investment of well over one hundred million dollars. The value of the fish as first packed averages between fifty and sixty million dollars annually, a large part of which has already been paid out for supplies and in wages.

An analysis of the industry showing its countless ramifications in which it touches the life of thousands of people in every part of the world is very surprising and instructive. Rice from the East Indies; coffee from Central and South America; flour from the plains of Canada and the United States; sugar from Cuba; tea from Ceylon and China; nets, crockery, and woollens from England; nails, cables, and wire-netting from Germany; tin from Wales and Straits Settlements; resins, gums and lacs for varnishes and enamels from Africa and India; raw wool from Australia; canned foods from the United States and Canada; lumber from the Pacific North-West; there is hardly a section of the globe which does not contribute something to the salmon canning industry and receive in return a share of each season's pack.

The canning of salmon is a hazardous and highly speculative industry, depending as it does upon the uncertain return of fish, which may be menaced by unfavourable climatic conditions, shortness of food supply, and by many natural enemies. If, for any reason, the salmon fail to return at the expected time and place, the canner, with hundreds of thousands of dollars invested in cannery machinery, tinplate, and other supplies, and pledged in labour contracts, stands to lose heavily. In favourable years he may make enough profits to more than balance his losses in the unfavourable years. At all events the lure is there, and men no doubt will continue to accept the chance and the world will continue to have this delicious, healthful, and highly nutritious food.

List of Articles and Bulletins on Canned Salmon from the North-West Branch, National Canners' Association, Seattle, Washington.

1. Report of the Director, 1919.
2. Report of the Director, 1920.
*3. "Heat Penetration in Canned Salmon." With curves showing temperature at centre of different sized cans throughout cooking process, obtained by thermo-couples.—*Pacific Fisherman*, Vol. 18, No. 7, p. 51 (July, 1920).
4. "A Biochemical Study of Pacific Coast Salmon." A detailed study of changes in salmon flesh during decomposition.—*Publications Puget Sound Biological Station*, Vol. 3, No. 67, pp. 195-272 (1922); *Chemical Abstracts*, Vol. 17, No. 21, p. 3550 (1923). (Nearly out of print.)
5. "The Function of Vacuum in Canned Salmon." The contents of cans with low vacuum may be perfectly normal, but through certain physical changes, such as increase in temperature or altitude, the can appears abnormal.—*Pacific Fisherman*, Vol. 21, Nos. 5, 6, 7 (May, June, July, 1923); *Zent. f.d. gesamte Hygiene*, VI., 3, 189 (1924) (abstract). (Out of print.)
*6. "Examination of Canned Salmon." A description of the various species of salmon, and a method of judging the canned product.—*Pacific Fisherman*, Vol. 21, Nos. 9, 10 (September and October, 1923); *Chemical Abstracts*, Vol. 18, No. 6, p. 868 (1924).

7. "The Story of Canned Salmon. Brief description of life-history, species, and canning. Illustrated.—*American Food Journal*, Vol. 19, pp. 320-1 (1924); *Chemical Abstracts*, Vol. 18, No. 22, p. 3656 (1924).

8. "A Chemical Study of Canned Salmon." Variations in Composition of the Pacific Coast Salmons and Steelhead Trout as Influenced by Species and Locality Where Caught. An extended investigation of canned salmon of all species and from all American canning districts, together with a brief description of the different species and their life history.—*Industrial and Engineering Chemistry*, Vol. 16, No. 3, p. 283 (March, 1924); *Chemical Abstracts*, Vol. 18, No. 7, p. 1019 (1924).

9. "Hydrogen Sulphide Determination in Bacterial Cultures and in Certain Canned Foods." The foods included salmon and shrimp in various stages of decomposition; and canned gooseberries, which had been sprayed with lime-sulphur spray, causing hydrogen swells. —*Journal of Bacteriology*, Vol. 9, No. 3, pp. 235-249 (May, 1924); *Chemical Abstracts*, Vol. 18, No. 17, p. 2731 (1924).

*10. "Indol and Skatol Determination in Bacterial Cultures." Showing how these substances may be determined, and a list of organisms which produce them.—*Journal of Bacteriology*, Vol. 10, No. 2, pp. 105-133 (1925); *Chemical Abstracts*, Vol. 18, No. 17, p. 1581 (1925).

*11. "A Study of the Gases in Canned Foods." Apparatus for the collection and analysis of gases in normal and abnormal canned foods and their significance.—*University of Washington Publications in Fisheries*, Vol. 1, No. 4, pp. 86-98 (1925); *Chemical Abstracts*, Vol. 20, No. 1, p. 72 (1926).

*12. "Notes on the Presence of Indol in Sea Foods and Other Food Products." Chemical determination of indol as a test for decomposition. —*University of Washington Publications in Fisheries*, Vol. 1, No. 5, pp. 101-108 (1925); *Chemical Abstracts*, Vol. 20, No. 1, p. 72 (1926).

*13. "Crystals Found in Canned Salmon." Harmless crystals sometimes mistaken for broken glass.—*Pacific Fisherman*, Vol. 23, No. 10, p. 11 (October, 1925); *Chemical Abstracts*, Vol. 20, No. 10, p. 1673 (1926).

*14. "Losses in Canned Salmon Due to Overfilling." Overfilled cans frequently have their ends bulged out and are, in consequence, condemned as unfit for food.—*Pacific Fisherman*, Vol. 24, No. 4, p. 5 (April, 1926).

*15. "Bacteriological Investigations on Raw Salmon Spoilage." Species of bacteria responsible for the decomposition of salmon.—*University of Washington Publications in Fisheries*, Vol. 1, No. 8, pp. 157-188 (July, 1926); *Chemical Abstracts*, Vol. 21, No. 3, p. 463 (1927).

*16. "Canned Salmon: A Five-Year Correlation Study of Certain Quality Factors." A summing-up and evaluation of the laboratory results of the salmon examined during five years. *University of Washington Publications*, Vol. 1, No. 9, pp. 189-204 (August, 1926); *Chemical Abstracts*, Vol. 21, No. 6, p. 968 (1927).

17. "Iodine Content of the Pacific Coast Salmon." Salmon contains a notable amount of this valuable substance.—*University of Washington Publications*, Vol. 1, No. 6, pp. 109-140 (February, 1926); *Chemical Abstracts*, Vol. 20, No. 11, p. 1872 (1926).

*18. "Salmon in a Diet for the Prophylaxis of Goitre." Salmon, on account of its high content of iodine, is a valuable food in the prevention of goitre.—*Journal of the American Medical Association*, Vol. 86, pp. 1339-1340 (May 1, 1926).

*19. "Chemical Composition of Fish and Shellfish." Part 1 of a Bulletin entitled "Nutritive Value of Fish and Shellfish."—U.S. Bureau of Fisheries Document No. 1000 (1926); *Chemical Abstracts*, Vol. 21, No. 17, p. 2944 (1927).

20. "The Salmon Canning Industry." A brief description of the method of canning and the canned product.—Pages 380-389 of a very comprehensive book entitled *Marine Products of Commerce*, Tressler, and others; The Chemical Catalog. Co., New York City (1923).

21. "A Bacteriological Study of Normal Canned Salmon."—*Journal of Bacteriology*, Vol. 12, p. 181 (1926).

22. "Non-Gaseous Spoilage in Canned Marine Products." Six cases traced to so-called "aerobic" sporulating bacilli.—*University of Washington Publications in Fisheries*, Vol. 1, No. 11, pp. 229-238 (October, 1927).

* In bulletin form, available for distribution from the North-West Branch, National Canners' Association, 826, Skinner Building, Seattle, Washington.

(*Continued from page* 445.)

Pressure is applied gradually and maintained by means of a screw set in a frame in which the cheese is held, till, in the course of a few days, all the remaining whey has been pressed out and the cheese is made. As regards finish beyond this point, in some cases the coat of the cheese has to be coloured—*e.g.*, Gloucester cheese in England, or Edam cheese in Holland, and most of the larger varieties have to be clothed in a bandage. This may be a square of linen sewn on tightly, a cotton roller bandage stuck on at the finish of the roll with flour paste, or some other variation according to custom.

Confectioners', Bakers', and Allied Traders' Thirty-second International Exhibition

Entries in Competitions

A WORD or two explaining why competitors may not have received receipts for their entry fees may be reassuring.

Unfortunately, about 90 per cent. of competitors delay until the last moment sending their entries; the consequence is that thousands are received on the closing day and the day after, and although a staff of clerks does nothing else but attend to these entries, it is not possible to get the receipts despatched by return of post.

Competitors who do not receive their receipts within a week after sending their entries should communicate with the Exhibition authorities.

We learn from the directors of the Annual Bakers' Exhibition and Market that the altered and enlarged medals and diplomas presented to the winners at the Exhibition last year were very much appreciated. It will be remembered that, in accordance with a wish expressed by a number of members of the trade, the old style of diploma was reverted to. The medals, gold, silver, and bronze, were increased both in size and value by 50 per cent. A large number of expressions of appreciation from the prize-winners were received, so that we may conclude the size, design, etc., of the new medals and diplomas met with the entire approval of the trade.

Closing of City Office

The City offices of the Exhibition at 11, Queen Victoria Street will be closed from Wednesday, August 29, to Tuesday, October 2. The address in the meantime will be the Royal Agricultural Hall, London, N.

Charities at the Exhibition

The only charities who have permission to make collections or sell souvenirs in the Exhibition will wear a distinctive badge, which is bright yellow, bearing the words "Trade Charities, Official Collector, 1928." These charities represent the three official trade benevolent funds or institutions. Exhibitors and visitors would help these funds by reporting any collector they happen to see in the Exhibition not wearing one of the official badges referred to above.

A Hint Regarding the Exhibition

Visitors to this year's Exhibition will find amongst the merchants and manufacturers exhibiting everything they require for the next twelve months, but these visitors are advised not to leave the Exhibition without visiting the Princes' Gallery, where a number of important firms will be found. The Princes' Gallery is situated immediately over the Entrance Hall, and can be reached either through the Main Gallery or by the steps immediately on the left of the Main Entrance to the Exhibition. Amongst other interesting exhibits in this Princes' Gallery will be found what is probably the largest and most comprehensive exhibit of chocolate which has ever been made in any exhibition by a single firm.

The Railway and the Exhibition

A number of excursions will be available for visitors to the Exhibition to be held at the Royal Agricultural Hall from September 8 to 14. Particulars of these excursions, as usual, can be obtained from the local stationmaster.

It is greatly to be regretted that the railway companies are still unable to see their way to granting special facilities to individuals similar to those made in connection with exhibitions in the provinces. Organisers of all classes of exhibitions have been endeavouring for some years to get the railway companies to issue vouchers entitling individual buyers at these exhibitions to travel at a reduced rate. Parties of twelve can, of course, obtain tickets at a reduced rate.

Among other exhibitors the following may be mentioned:

Amalgamated Dairies, Ltd., 3, Laurence Pountney Hill, E.C. 4.

American Cockroach and Blackbeetle Solvent Co., 124, Southwark Street, S.E. 1.

Antelope Co., 6, Lloyd's Avenue, E.C. 3.

Artofex Engineering Works, Ltd., 6 and 8, Pentonville Road, N. 1.

Associated Ivorine and Metal Products, Ltd., 349, Euston Road, N.W. 1.

Automatic Scale Co., Ltd., Broadheath, Altrincham, and 43, Old Street, E.C. 1.

Avery, W. and T., Ltd., Soho Foundry, Birmingham.

Baker, Perkins, Ltd., and David Thomson, Ltd., Westwood Works, Peterborough.

Barrons (Leicester), Ltd., 120, High Street, Tooting, S.W. 17.

Bart-Newhill and Co., Southampton House, 317, High Holborn, W.C. 1.

Belhaven, Ltd., Belhaven Works, Wishaw, Scotland.

Bellamy, A., and Co., Ltd., 23, Harp Lane, E.C. 3, Cardiff and Wolverhampton.

Boyd and Co., Zion Street Meal Factory, Sunderland.

Bramigk and Co., Ltd., 92, Fenchurch Street, E.C. 3.

Bristol Steam Oven Works, Ltd., Fishponds, Bristol.

British Arkady Co., Ltd., Skerton Road, Old Trafford, Manchester.

British Creameries, Ltd., Wilmington, Hull.
British DiaMalt Co. (H. A. and D. Taylor, Ltd.), Sawbridgeworth, Herts.
British Essence Co., Ltd., 161a, Upper Kennington Lane, S.E. 11.
British Malt Products, Ltd., Lothian House, 1, Market Street, Bermondsey, S.E. 1.
Burton, G., School of Confectionery and Bakers' Supply, Park Road, Blackpool.
Burton, Son and Sanders, Ltd., College Street, Ipswich.
Bush, W. J., and Co., Ltd., Ash Grove, Hackney, E. 8.
Camwheat Pie Machine Co., Ltd., Crownall House, Park Place, Leeds.
Carter, J. Harrison, Ltd., Dunstable, Beds.
Cellophane Co., Ltd., 7/9, Bird Street, W. 1.
Central Currant Office (London), 10, New Bridge Street, E.C. 4.
Clapham, S. W., Oven and Furnace Builder, 20, Ilex Road, Willesden, N.W. 10.
Collins, T., and Co., Ltd., St. Werburgh's Road, Bristol.
Cooke, Tweedale and Lindsay, Ltd., 41, Corporation Street, Manchester. London Office: 5, Idol Lane, Eastcheap, E.C. 3.
Doring, E. Duncan, Charterhouse Chambers, 18, Charterhouse Square, E.C. 1.
Dudley and Co., Ltd., 451, 544, 550, 554, and 558, Holloway Road, N. 7, and 65, Fore Street, E.C. 2.
Dumbrill Plant and Engineering Co., 60, Queen's Road, Battersea, S.W. 8.
Ericsson, C. O., Engineering Works, Woodfield Road, Balsall Heath, Birmingham.
Federal Paper Co., Ltd., Napier House, 24, High Holborn, W.C. 1.
Ferns Emulsifiers, Ltd., 23, Howard Street, Tottenham Court Road, W. 1.
Forgrove Machinery Co., Ltd., Dewsbury Road, Tram Terminus, Leeds.
Four Oaks Spraying Machine Co., Four Oaks Works, Sutton Coldfield, near Birmingham.
Frigidaire, Ltd., Frigidaire House, Chapter Street, Westminster, S.W. 1.
Gardner, W., and Sons (Gloucester), Ltd., Bristol Road, Gloucester.
General Electric Co., Ltd., Magnet House, Kingsway, W.C. 2.
Globe Refining Co., Ltd., Eugene Street, Pennywell Road, Bristol.
Green (James) and Nephew, Ltd., 5, Upper Thames Street, E.C. 4.
Griffith and Diggens, Ltd., Palace of Industry, Wembley.
Hansella, Ltd., Diamond House, 37/38, Hatton Garden, E.C. 1.
Herbert and Sons, Ltd., 6/7, West Smithfield, E.C. 1.
Herbst Machinery Co., 192, Hackney Road, E. 2.
Hobart Manufacturing Co., Ltd., Hobart House, 38, Charterhouse Street, E.C. 1.
Homatra, Ltd., Mortlake, S.W. 14.
Hunt, John, Alma Works, Rasbottom Street, Bolton.
Johnsen and Jorgensen Flint Glass, Ltd., 26 and 27, Farringdon Street, E.C. 4.
Joseph, N. C., Ltd., St. Eloi Aluminium Works, Stratford-on-Avon.
Kent and Co. (Globe Works), Ltd., South Grove, Bow, E. 3.
Kirby's Refineries, Ltd., Albion Works, Clack Street, Rotherhithe, S.E. 16.
Kneeda Manufacturing Co., Chandos House, Palmer Street, Victoria Street, S.W. 1.
Lang (Jules) and Son, Charlton Works, Charlton Place, Islington, N. 1.
Loders and Nucoline, Ltd., 1, Crutched Friars, E.C. 3.
London Essence Co., Ltd., Lofresco Works, Glengall Road, Peckham, S.E. 15.
London Refiners, Ltd., Hookers Road, Blackhorse Lane, Walthamstow, E. 17.
Low and Duff, Ltd., Albert Works, Monifieth, near Dundee, and Hastings House, Norfolk Street, Strand, W.C. 2.
Mabbott and Co., Ltd., Phœnix Iron Works, Manchester, and 37/39, Old Street, E.C. 1.
Manchester Chemical Co., Ltd., Bradshaw Street, Shudehill, Manchester.
Mason, W. F., Ltd., Mona Works, Levenshulme, Manchester.
Masson-Seeley and Co., Ltd., Masseeley Building, Howick Place, Westminster, S.W. 1.
Mattocks and Son, 246, Walworth Road, S.E. 17.
Melvin, T., and Sons, Ltd., St. Rollox Iron Works, Charles Street, Glasgow.
Monarch Chemical Co., 82, Borough High Street, S.E. 1.
Morton Machine Co., Wishaw, Scotland, and 1, Brixton Road, S.W. 9.
Olland Scales Co., Trafalgar Buildings, 1, Charing Cross, W.C. 2.
Paillard and Benoit, 273, Union Street, Blackfriars, S.E. 1.
Peerless Electrical Manufacturing Co., Ltd., 167/169, Great Portland Street, W. 1.
Peerless Refining Co. (Liverpool), Ltd., 49, Cheapside, Liverpool.
Pelkman Bros., Ltd., 3, Milk Street Buildings, E.C. 2.
P.I.V. Chain Gears, Ltd., 7, Princess Street, Westminster, S.W. 1.
Portway, C., and Son, the "Tortoise" Stove Works, Halstead, Essex.
Read's Mixers and Oven Co., Ltd., 260, Kilburn Lane, W. 10.
Smith, H., and Son, 45, College Street, Belvedere Road, Lambeth, S.E. 1.
Southern Oil Co., Ltd., 14, Devonshire Square, E.C. 2.
Standard Yeast Co., Ltd., Lamb Distillery, Church Street, Chiswick, W. 4.
Thomas and Bishop, Ltd., 37, Tabernacle Street, E.C. 2.
Tiverton Roller Mills Co., Tiverton, Devon.
United Yeast Co., Ltd., 11, Pentonville Road, N. 1, and 190/194, St. John Street, E.C. 1, and 80, Miller Street, Manchester.
Vitagro Patent Malt Flour Co., 66, Lant Street, Borough, S.E. 1.
Walker, Hunter and Co., Ltd., Port Downie Iron Works, Falkirk.

Overseas News

Importation of Skimmed Milk again Permitted in British East Africa

A PROCLAMATION, issued by the Governor of Kenya Colony under date of May 21, 1928, revokes the proclamation of February, 1921, which prohibited the importation of all skimmed milk containing less than 9 per cent. milk fat into Kenya Colony.

Hawaiian Pineapple Canneries Busy

Pineapples are ripening satisfactorily on all the islands and the canneries are working full time, according to cabled information of July 20 from the Chamber of Commerce of Honolulu to the Department of Commerce.

Sardine Market Slow in Singapore

The sardine market of Singapore is reported by local importers to be overflooded, according to a cable of July 23 from Mr. Bliss, at Singapore. This condition is discouraging to the larger importers, who claim the shippers' present policy of indiscriminate selling may prove suicidal to the local market. In spite of the heavy stocks, however, dealers are beginning to inquire for syndicate supplies.

Canadian Jam Factory Manufactures New Marmalade

The Cambridge Jam Factory, located at Cambridge Station, Kings County, has developed a new product, a marmalade made from oranges and cane sugar, according to a report of July 16 from A. J. McConnico, at Yarmouth. This is called "Gleam O'Gold," and is said to have a ready market.

Inauguration of Chain Stores in Chile

There has been recently received by the Department of Commerce a report on the above subject from R. H. Glover, at Santiago, Chile. The report describes many of the problems which confront this type of distribution in Chile, viz., location of store, class of patronage, education of buyers to new methods of purchasing, terms of sale to customers, standardisation of containers for locally manufactured foods, and personnel of the stores.

Finland Reduces Import Duties on Foodstuffs

The State Council, regarding its decision of December 30, 1927, increasing import duties of certain goods brought into the country during 1928, ha ordained that the duties on certain goods shall b lowered as follows, according to a report of June 23 from F. B. Lyon, at Helsingfors: Goods coming under position 25 in the Customs Tariff shall be reduced to 15 marks per kilogram (meat extracts, concentrated soups, soy and other sauces, except in airtight receptacles). Goods coming under position 14 in the Customs Tariff (meat extracts, concentrated soups, soy and sauces in airtight receptacles) shal be reduced to 25 marks per kilogram.

New Plant for Chilling of Fresh Fish in Newfoundland

The Fishermen's Union Trading Company, operating in various outports of Newfoundland, has now completed a cold storage plant, which has adopted the brine chilling process, and turned out its first chilled salmon on June 6, 1928, according to a report of June 14, from A. M. Warren, at St. John's.

Atlantic salmon weighing from fifteen to eighteen pounds are satisfactorily chilled in the new plant after an immersion of five hours. The daily initial capacity of the chill-room is seven thousand pounds of fish, and the plant has storage room for packing one hundred and fifty thousand pounds of fish in boxes.

During the 1928 season efforts will be made to chill and pack fish for shipment by rail to Canadian and American markets, and during the 1929 season it is hoped to inaugurate a line of refrigerated steamers for the transportation of cargoes of chilled Atlantic salmon to British markets.

New Regulations under Canadian Meat and Canned Foods Act Concerning Salmon

By order in Council, dated June 26, 1928, the regulations adopted July 24, 1922, under the Meat and Canned Foods Act governing the inspection of canned fish and shellfish and the operations of canneries have been amended by the addition of the following sections:

"9a.—Pink salmon taken in waters about the Queen Charlotte Islands, British Columbia, and transported to any cannery on the mainland of the said province or on an island immediately adjacent thereto, there to be canned, shall be deemed to be unfit for human food, unless the entrails are removed therefrom immediately after they are caught, and they are then packed in and transported in crushed ice.

"9b.—Salmon taken in the waters about District 1, 2, or 3, and that are transported to any canner,

cross Queen Charlotte Sound from where they are caught, there to be canned, shall be deemed to be unfit for human food, unless the entrails are removed therefrom immediately after they are caught, and they are then packed in and transported in crushed ice."

Canned Food Production in Canada

The total value of production of all products and by-products of the canned foods industries in Canada during 1926 was $54,146,846, according to a statement recently issued by the Dominion Bureau of Statistics. An indication of the expansion of the industry during the present century is afforded by the fact that the total value of production of canned foods in Canada in 1900 did not exceed $8,250,000, while in 1926 it had increased to nearly $49,000,000.

In 1926 the value of canned fish products and by-products was $23,076,288; fruits and vegetables, $16,233,960; condensed and evaporated milk, $13,159,659; meats, $961,066; and syrups, $715,873.

During the year under review there were 734 establishments primarily employed in the production of canned foods; capital employed was $49,257,280; employés totalled 20,431, and $7,138,339 was paid out in salaries and wages. Exports of canned foods, the produce of Canada, during 1926 had a value of $19,847,576, of which canned fish totalled $13,911,648. Imports amounted to $6,146,280, mostly of fruits and vegetables not grown in Canada.

Caviar Industry of Persia

Before the World War, 95 per cent. of the caviar produced from the Persian fisheries, along the southern coast of the Caspian Sea, was controlled by a large Russian firm, according to a report of May 16 from David Williamson, at Teheran. With the change of régime, however, the Soviet Government took over the above mentioned firm's share of the industry.

By the Soviet-Persian agreement of October 1, 1928, all fish caught in Persian waters emptying into the Caspian Sea becomes the property of a company jointly established and owned by the Persian and Soviet Governments. The convention also provides that the products of the fisheries shall be sold on the markets that command the highest prices. The company's directorate is composed of three Persian and three Russian members. The manager of the company is Russian.

The wholesale prices of the best grades of caviar, known in the trade as Celuga, range from 2s. 7d. to 3s. 6d. per pound. The pickled and pressed varieties sell for considerably less. Although it is practically impossible to obtain production cost, estimates which have been made range between 1s. 9d. and 2s. 4d. per pound. Based upon past production figures it may be roughly calculated that the annual gross profit of the industry is in the neighbourhood of £18,000.

Almost all of the caviar produced in Persia is exported to Russia, where by marketing it with Russian caviar a substantial price is obtained. A further profit is then realised by selling the caviar in the United States and Europe for gold and paying the Persian industry in Russian currency.

Canada's Maple Sugar Industry

Canadian production of maple sugar and maple syrup in 1928 is estimated to have had a value of $5,584,588, the highest recorded since 1924, when, with higher prices prevailing, the output was valued at $5,991,141. Last year the value was $4,934,811.

The industry of collecting sap from the maple trees and boiling it down to maple syrup and sugar is one which is confined entirely to the American Continent, and had its beginning before the advent of the white man. The Indian had already learned to extract and concentrate the sap of the maple. On the approach of spring the trees were gashed with the tomahawk and the sap collected in birch bark receptacles, afterwards being boiled in earthenware kettles.

The maple products industry is to-day one of Canada's most stable special agricultural industries, though it is subject to some seasonal variation due to weather conditions. It is confined to Quebec, Ontario, Nova Scotia, and New Brunswick, these provinces ranking in the order named with Quebec and Ontario, accounting for over 98 per cent. of the production. According to the estimate of the Dominion Bureau of Statistics, Quebec had an output this year of 13,090,029 pounds of maple sugar and 909,646 gallons of maple syrup, the two products together being valued at $3,604,417. For Ontario, the figures are 570,180 pounds of sugar and 757,535 gallons of syrup, valued at $1,888,622.

Canada's maple delicacies, now produced with modern sanitary collecting and evaporating equipment entitling them to rank as pure food products of the highest excellence, have become an important item in overseas trade, especially with Great Britain. For the fiscal year ended March 31 last, an increase in maple sugar exports to the United Kingdom of 56·7 per cent. is shown, the total amounting to 6,551,296 pounds valued at $1,141,783. As yet maple syrup has not been exported to any extent, this product finding a ready sale in Canada. The better market which has been established for Canadian maple products is reflected to some extent in higher prices, the averages for 1928 being reported as $1·97 per gallon for syrup compared with $1·66 last year, and 16 cents per pound for sugar compared with 14 cents in 1927.

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

New Companies

SCHOFIELD AND MARTIN, LIMITED. (232196) Regd. July 21, 1928. To take over the bus. of a grocer, provision mcht. and genl. trader cd. on at Southend-on-Sea, and elsewhere, as "Schofield and Martin." Nom. Cap.: £50,000 in 20,000 preference and 20,000 "A" ordinary shares of £1 each and 50,000 "B" ordinary shares of 4/- each.

THAMES VALLEY ICES (READING), LIMITED. (232160) Regd. July 20, 1928. 2, Bridge Street, Caversham. To take over the bus. of an ice-cream mnfr. and café propr. cd. on at Thames Valley Bldgs., Caversham, Reading, as "Thames Valley Ices." Nom. Cap.: £2,000 in 1,500 preference shares of £1 each and 10,000 ordinary shares of 1/- each.

WILKINS (CONFECTIONERS), LIMITED. (232166) Regd. July 20, 1928. Fern House, Church Street, Cromer, Norfolk. To carry on the bus. of bakers, millers, corn and flour factors, wholesale and retail confectioners, etc. Nom. Cap.: £3,000 in £1 shares.

LEDBURY PRESERVES (1928), LIMITED. (232187) Regd. July 21, 1928. To take over the bus. formerly cd. on by Ledbury Preserves, Ltd., and all or any of the assets and liabilities of the present proprietors, and to carry on the bus. of mnfrs., bottlers, and dlrs. in jams, marmalades, jellies, preserves, sauces, etc. Nom. Cap.: £10,000 in £1 shares.

ALLIED FOODSTUFFS, LIMITED. (232279) Regd. July 26, 1928. 22, Basinghall Street, E.C.2. To carry on the bus. of genl. mchts., storekeepers, etc. Nom. Cap.: £200 in £1 shares.

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TRADE BOARDS ACTS, 1909 AND 1918.

MILK DISTRIBUTIVE TRADE BOARD (ENGLAND AND WALES).

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Particulars of the proposed minimum rates may be obtained on application to the Secretary of the Trade Board.

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F. POPPLEWELL,
Secretary.

July 31, 1928

MERCHANDISE MARKS ACT, 1926.

Notice is hereby given that His Majesty in Council was pleased on the 30th day of July, 1928, to approve an Order in Council under the above named Act, entitled the "Merchandise Marks (Imported Goods) Order, 1927, Amendment Order, 1928."

Trade Publications

We have received a copy of *The Glass Lining*, an American journal published monthly by The Pfaudler Company, of Rochester, New York. It can be obtained from Enamelled Metal Products Corporation, Ltd., 56, Kingsway, London, W.C.2. This paper should prove of interest to those in the milk and cheese industries.

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We have also received a booklet entitled *Maté and Mankind* from Messrs. E. and F. Newall, Ltd., the original producers of yerba maté products.

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Books Received

Private Companies: Their Utility and the Exemptions they Enjoy. By Herbert W. Jordan. 13th edition. Published by Jordan and Sons, Ltd., 116 to 118, Chancery Lane, London, W.C. 2. July, 1928. 64 pages. Post free, 1s. 9d.

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133. Rapid Determination of Vaseline Oil in Coffee. (Miss) E. A. Gauthier. (*Annali. Chim. Appl.*, 1928, 18, 194-195.)

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

New Companies

SCHOFIELD AND MARTIN, LIMITED. (232196) Regd. July 21, 1928. To take over the bus. of a grocer, provision mcht. and genl. trader cd. on at Southend-on-Sea, and elsewhere, as "Schofield and Martin." Nom. Cap.: £50,000 in 20,000 preference and 20,000 "A" ordinary shares of £1 each and 50,000 "B" ordinary shares of 4/- each.

THAMES VALLEY ICES (READING), LIMITED. (232160) Regd. July 20, 1928. 2, Bridge Street, Caversham. To take over the bus. of an ice-cream mnfr. and café propr. cd. on at Thames Valley Bldgs., Caversham, Reading, as "Thames Valley Ices." Nom. Cap.: £2,000 in 1,500 preference shares of £1 each and 10,000 ordinary shares of 1/- each.

WILKINS (CONFECTIONERS), LIMITED. (232166) Regd. July 20, 1928. Fern House, Church Street, Cromer, Norfolk. To carry on the bus. of bakers, millers, corn and flour factors, wholesale and retail confectioners, etc. Nom. Cap.: £3,000 in £1 shares.

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133. Rapid Determination of Vaseline Oil in Coffee. (Miss) E. A. Gauthier. (*Annali. Chim. Appl.*, 1928, 18, 194-195.)

Current Literature

Fruit and Vegetable Products

95. Organic Acids of Tomatoes, II. A. Borntraeger. (*Zeit. Unters. Lebensm.*, 1928, 55, 112-143; *cf.* B., 1926, 105.)

96. Microscopical Structure of some Tropical Fruits and their Detection in Marmalade-like preparations such as "Lukutate-pulp." C. Griebel. (*Zeit. Unters. Lebensm.*, 1928, 55, 89-111.)

97. Application of Luminescence [in ultra-violet light] to the Examination of Apple Pulp and Turnip Pulp. F. M. Litterscheid. (*Zeit. Unters. Lebensm.*, 1928, 55, 175-178.)

98. Determination of Citric Acid in Fruits and Fruit Products. B. G. Hartmann and F. Hillig. (*J. Assoc. Off. Agric. Chem.*, 1928, 11, 257-266.)

99. Determination of Malic and Citric Acids in Fruit Juice and Jam. C. Espeso. (*Ann. Falsif.*, 1928, 21, 201-203.)

100. Chemical Examination of Finger Limes (*Citrus Australasica.*) G. R. Gannon. (*J. Proc. Sydney Tech. Coll. Chem. Soc.*, 1927, 3, 29-32.)

101. Manganese Content of Raw and Cooked Vegetables. S. Munger and W. H. Peterson. (*J. Home Econ.*, 1928, 20, 194-200.)

102. Pectic Constituents of Tomatoes and their Relation to the Canned Product. C. O. Appleman and C. M. Conrad. (*Md. Agric. Exp. Sta. Bull.*, 1928, No. 291, 1-17.)

Cereal Products

103. Determination of Corncockle in Flour by Haemolysis. F. S. Okoloff. (*Zeit. Unters. Lebensm.*, 1928, 55, 155-162.)

104. Analysis of Dietary Products, especially Gluten and Almond Breads. R. Lecoq. (*J. Pharm. Chim.*, 1928 [viii.], 7, 539-548.)

105. Tallowness or Rancidity in Grain Products. M. S. Fine and A. G. Olsen. (*Ind. Eng. Chem.*, 1928, 20, 652-654.)

106. Analytical Detection of Bleaching of Wheat Flour. H. Jorgensen. (*Res. Bage-og Mellaboratoriet*, Copenhagen, 1928, 70 pp.)

107. Factors influencing the Absorption in Experimental Baking [of Dough]. J. Micka and E. Child. (*Cereal Chem.*, 1928, 5, 208-214.)

108. Yeast Fermentation in Flour-water Suspensions. T. R. James and L. X. Huber. (*Cereal Chem.*, 1928, 5, 181-191.)

109. Lipoid Phosphorous Wheat and its Distribution. B. Sullivan and C. Near. (*Cereal Chem.*, 1928, 5, 163-168.)

110. Action of Phosphatides in Bread Dough. E. B. Working. (*Cereal Chem.*, 1928, 5, 223-234.)

111. Effect on their Bread-making Properties of extracting Flour with Ether. A. H. Johnson. (*Cereal Chem.*, 1928, 5, 169-180.)

112. "Rope" in Bread. E. A. Fisher and P. Halton. (*Cereal Chem.*, 1928, 5, 192-208.)

Dairy Products

113. Determination of Buttermilk or Milk Products in a Mixed Feed by Determination of the Lactose Present. M. R. Coe. (*J. Assoc. Off. Agric. Chem.*, 1928, 11, 251, 257.)

114. Relation of Milk Solids-not-fat to overrun and quality of Ice-cream. P. S. Lucas and W. J. Robertson. (*Mich. Agric. Exp. Sta. Tech. Bull.*, 1927, No. 86, 1-16.)

115. Glycerin in Cream. A. F. Lerrigo. (*Analyst*, 1928, 53, 335-336.)

116. Tests for Reconstituted Cream. F. W. Richardson. (*Analyst*, 1928, 53, 334-335.)

117. Determination of Butter in Margarine. L. V. Cocks and E. Nightingale. (*Analyst*, 1928, 53, 322-327.)

118. Chemical Sterilisation in the Dairy Industry. M. J. Prucha. (*World's Butter Rev.*, 1928, 2, 12-17.)

119. Obtaining Crude Lactose and other Solids from Sweet Whey. R. W. Bell, P. N. Peter, and W. T. Johnson, Jun. (*J. Dairy Sci.*, 1928, 11, 163-174.)

120. Nature of Microscopic Grains in Cheese. O. Laxa. (*Lait*, 1927, 7, 521-525; *Chem. Zentr.*, 1927, II., 1314.)

Various

121. Casein formed by Acid and Casein formed by Rennet, and the Transformation of the Former into the Latter. C. Porcher. (*Chim. et Ind.*, 1928, 19, 589-598, 809-816; *cf.* A., 1926, 795.)

122. Mass production of Yeast as a Feeding-stuff. H. Claassen. (*Chem.-Ztg.*, 1928, 52, 407.)

123. Diastase in Honey. J. Fiehe and W. Kordatski. (*Zeit. Unters. Lebensm.*, 1928, 55, 162-169.)

124. Biological Values of Certain Types of Sea Foods, III. Vitamins in Clams. D. B. Jones, E. M. Nelson, J. C. Murphy [with J. P. Devine]. (*Ind. Eng. Chem.*, 1928, 20, 648-652.)

125. The Chemistry of Wine Making. J. T. Hewitt. (*Analyst*, 1928, Aug., 437.)

126. Nutritive Value of Hydrogenated Oils. S. Ueno, M. Yamashita, and M. Ota. (*J. Soc. Chem. Ind.*, Japan, 1928, 31, 92B.)

127. The Iron Content of Plant and Animal Foods. W. H. Peterson and C. A. Elvehjem. (*J. Biol. Chem.*, 1928, 78, 215-223.)

Analysis

128. Composition and Evaluation of Honey from Sugar-fed Bees. J. Fiehe. (*Zeit. Unters. Lebensm.*, 1928, 55, 169-173.)

129. Determination of Caffeine in Tea. W. A. Uglow and A. M. Schapiro. (*Zeit. Unters. Lebensm.*, 1928, 55, 149-155.)

130. The Identification of Prohibited Coal Tar Colours in Foodstuffs. A. R. Jamieson and C. M. Keyworth. (*Analyst*, 1928, Aug., 418.)

(*Continued on preceding page.*)

Recent Patents

These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

21331. AXELROD, A.: Device for heat treatment of cheese. July 23.

21375. BROWN, G.: Machine for irradiating fluids and foodstuffs, etc. July 23.

21493. CALLIMACHI, MICHAEL, THEODORE, COUNT: Treatment of molasses, etc. July 24.

21793. MANUFACTURE DE MACHINES AUXILIAIRES POUR L'ELECTRICITÉ ET L'INDUSTRIE.: Cold extraction of fish oils. July 27.

22680. JESSETT, F. A. C.: Utilisation of skimmed milk. August 4.

Specifications Published

269,923. AVANZI, M.: Process and apparatus for treating fish, animal, or vegetable products.

287,119. POHLMANN, J., AND RASSERS, J. R. F.: Removing albuminous substances from saccharine juices, molasses, and the like.

294,520. FARNELL, R. G. W.: Extraction of sugar from beet.

294,586. LEECH, W. S., AND SHERMAN, A. E.: Treatment of air for the preservation of foodstuffs and like uses.

294,790. NYROP, A.: Method of manufacturing chocolate.

Printed copies of the full Published Specifications may be obtained from the Patent Office 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

Abstracts Published

290,195. **Food preparations; vitamins.** JAEGER, C., Sanatorium Universitaire, Leysin, Switzerland. A substance rich in vitamins is produced by exposing dried bananas preferably in meal condition and in thin layers to the action of ultra-violet rays.

290,206. **Bottle closures.** DREUW, H., 32, Neue Winterfeldstrasse, Berlin.

Stoppers with valves.—A bottle neck is formed with a discharge tube or pipe closed at its upper end except for apertures and the apertures are covered or uncovered by a centrally apertured disc adapted to be pressed against the end of the tube by a cap formed with a single outlet aperture and constructed with a portion to fit closely around the tube, the cap being secured on the neck by threads.

290,292. **Preserving fish, etc.** HANSEN, D. A., Andenes, Norway.

Fish—*e.g.*, herrings or stockfish, or livers, roes, or other parts of fish are preserved by treatment with a solution containing borax and an equal or preferably smaller amount of an acid preservative substance, such as boric acid or other suitable boron compound or salicylic acid. The solution may be made in fresh or sea water and may be applied by brushing, dipping, or immersing the fish. The preservatives are removed before sale or use by washing with fresh or sea water. The fish may be stored in the solution. Examples are given in the Specification.

290,459. **Confectionery; pressing dies.** WALLBURG, W. V., 27, Cottage Street, Melrose, Massachusetts, U.S.A.

The tops of confections are marked by embedding therein a die which is allowed to remain in position until the soft confection has hardened, whereupon the seal between the die and the confection is broken by admitting air between their contact surfaces, and the die is then removed. The die consists of a thin resilient sheet which bears a design and is permanently deformed to provide an outstanding wall, the die being temporarily deformable by pressure on its wall whereby its attachment with the confection is broken, and owing to its resiliency it assumes its original shape when the pressure is removed. The die is conveniently of celluloid and of cup shape, the bottom being provided with the design with, if necessary, small holes to allow for escape of air as the die is applied to the confection. By pressing inwards the opposite sides the die is flexed to break the air seal and it can then be lifted without injuring the coating of the confection. The die may be of oblong or other shape, and preferably at least a sufficient portion of it is transparent for the confection to be observed through the die.

290,615. **Pasteurising and cooling milk, etc.** ROTTGER, G., 1, Heidenau, Dresden, Germany.

Apparatus for pasteurising and subsequently cooling milk and other liquids comprises a container for the liquid, having a projecting upper rim by which it can be fitted tightly on the brim first of a pasteurising vessel and subsequently of an earthenware cooling vessel, so as to hang freely within these vessels. The container has handles and a lid with a thermometer. The vessel, which contains water, is heated until the milk reaches the pasteurising temperature, about 62° C., and the heat source is then withdrawn, the water keeping the milk at the required temperature for about twenty minutes. The container is then withdrawn, and after cooling in air or in cold water, is placed in vessel in which is cold water.

The vessel has porous walls through which the water percolates and evaporates on the outer surface, keeping container cool. The vessels can be used separately in the kitchen.

290,728. **Curing meat.** BACON, M. L., Southdown, Bramber, Sussex.

Beef, mutton, bacon, hams, tongues, and other kinds of meat are cured by insertion in an autoclave or like vessel which is then evacuated—*e.g.*, to a pressure of about half an inch of mercury. The curing material, which may be in the dry state or in solution, is next introduced at ordinary pressure or by gravity from an evacuated container, and evacuation is then continued and maintained for the rest of the curing process, the time of which is considerably reduced thereby—*e.g.*, to 60-70 hours. As a finishing step pressure may be employed for a short period—*e.g.*, one hour, by introducing air or preservative liquid under pressure.

291,124. **Cocoa preparations**. NORTH, C. E. 147, Park Street, Montclair, New Jersey, U.S.A.

For producing a stable milk and cocoa beverage, particularly intended to be put up for sale in glass bottles, etc., the milk or the mixture is subjected to the combined effect of heat and pressure applied for a period which is adjusted to the acidity of the milk or mixture, or the acidity is adjusted to heat, pressure, and time values, the object of the treatment being to increase the viscosity of the milk in the ratio of substantially 1·4 to 1 for the purpose of holding the cocoa and milk fat particles in suspension by partly coagulating the casein and albumen but without curdling the casein so that it separates out. The milk may be homogenised before the treatment. By way of example, for an acidity of 0·13 per cent. the desired viscosity and coagulation are obtained by heating to 248° F. under a pressure of 15 lbs. per sq. in. for fifty-five minutes.

291,567. **Closures for milk bottles, etc.** SMITH, J., Ltd., and SMITH, J., Mitre Mills, Richard Street, Birmingham.

Capsules and like closures.—In a metallic ring for securing a paper or other cap on a bottle, jar, etc., and of the kind having one end telescopically slidable within the other end when the ring is contracted into engagement with the cap, the interengaged ends are pinched, flattened, or otherwise distorted into locking engagement to prevent unauthorised retightening of the ring after it has been loosened.

292,162. **Wrapping-materials.** STANIOLFABRIK BURGDORF AKT.-GES., Burgdorf, Berne, Switzerland.

Metal foil for wrapping cheese is coated with a solution of bleached, colourless shellac in rectified spirit, to which salicylic acid may have been added.

292,202. **Yeast**. BUCHER, H., 78, Unter den Linden, Berlin.

Yeast is manufactured in an aerated wort which is continuously kept slightly acid; the nutrient compounds, comprising at least nitrogen and phosphorus, either produce no acid, in which case a small amount is added, or they produce just sufficient acid to maintain optimum acidity so that neutralisation is unnecessary, and further, the nutrients employed do not form insoluble acid compounds. Amongst the nitrogen-containing substances employed is carbamide, and during growth the yeast can be made to assimilate other elements by adding compounds of iodine, bromine, iron, etc. After separation of the yeast, the spent wort may be supplied with fresh nutrient and sown again.

292,237. **Confectionery**. HEAD, R., 82, Ashburnham Road, Luton, Bedfordshire, CLAY, C., 3, Lansdowne Place, and BAKER PERKINS, LTD., Hythe Road, Willesden Junction, both in London, and ANCIENS ETABLISSEMENTS A. SAVY JEANJEAN ET CIE SOC. ANON., Avenue Dubonnet, Courbevoie, Seine, France.

A continuous method of preparing cream fondant and the like is characterised in that sugar syrup or the like is continuously cooked, cooled, and passed through a beater or beaters into which, or any of which, is introduced a predetermined quantity of cooked or heated diluting syrup, the fondant mass and additional syrup then being further beaten or mixed. Glucose, albumen, colouring, or flavouring matter may be introduced either into the diluting syrup or into the beaters. Apparatus for carrying out the process may consist of an automatic cooker, a cooling drum which discharges into a beater or beaters, means for introducing diluting syrup into the beater or beaters either through a heater from the main cooker, or from a small auxiliary cooker, and an additional beater, having a tempering-jacket, for the mixture of diluting syrup and partially formed fondant.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

DIASTOL

484,033. **Essence of malted barley for use as food.** THE BRITISH MALT PRODUCTS COMPANY, LIMITED, Lothian House, 1, Market Street, Bermondsey, London, S.E.1. August 8, 1928.

AERO

488,601. **Edible fat.** FIELD AND COMPANY, FRUIT MERCHANTS, LIMITED, Turban House, 3, Eastcheap, London, E.C.3. August 8, 1928.

KINGWAY

488,679. **Margarine**. THE CRAIG-MILLAR CREAMERY CO., LIMITED, Craigmillar, Midlothian, Scotland. August 1, 1928.

ALA

490,123. **Cream**. DANO, LIMITED, 619 and 620, Bank Chambers, High Holborn, London, W.C.1. August 8, 1928.